COMMERCIAL FISHERIES
ABSTRACTS

C. F. T. R. I.
FISH TECHNOLOGY EXPERIMENT STATION,
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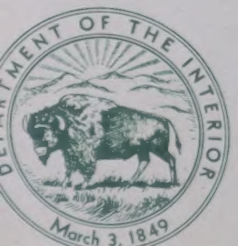
UNITED STATES DEPARTMENT OF THE INTERIOR
U.S. FISH AND WILDLIFE SERVICE
BUREAU OF COMMERCIAL FISHERIES



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Hoige Bazaar, MANGALORE.
11-8-1969.

0.112 ANOTHER LOOK AT ULTRAMICRO INTEGRATIVE FLAME PHOTOMETRY

Katz, George M. (Laboratory of Neurophysiology, Department of Neurology, College of Physicians and Surgeons, Columbia University, New York, N.Y. 10032)
Analytical Biochemistry 26, No. 3, 381-397 (December 1968)

In integrative flame photometry, the test sample is placed on a platinum pan or loop and dried, and the platinum carrier with sample is inserted into a flame. A characteristic luminous emission bursts forth as the sample is vaporized from the platinum and excited by the flame. The total output of light during the burst is a measure of the amount of salt in the sample. This technique has been used to detect as little as 10^{-14} mole of sodium or potassium.

A flame photometer is being used in the author's laboratory to study the electrophysiology of single muscle and nerve fibers. The present paper discusses the major factors that contribute to erratic behavior of the instrument and the extent to which these factors affect the measured quantity.

As a matter of side interest, the author found that, because the signal produced by the flame photometer is transient, additional information is provided by the shape of the signal. By proper interpretation of the characteristic shapes of the signals, the technique of integrative flame photometry can also be extended to the analysis of anions. [12 figures, 8 references]

 ABSTRACTER: F. T. Piskur

0.36 DEGRADATION OF POLYSACCHARIDES, MUCOPOLYSACCHARIDES, AND GLYCOPROTEINS BY LYSOSOMAL GLYCOSIDASES

Mahadevan, S., C. J. Dillard, and A. L. Tappel (Department of Food Science and Technology, University of California, Davis 95616)
Archives of Biochemistry and Biophysics 129, No. 2, 525-533 (February 1969)

Spiro (1965) indicated that the physiological role of enzymes such as β-N-acetylglucosaminidase in mammalian tissue is obscure and that these enzymes could potentially catalyze the catabolism of compounds that contain amino sugars (glycoproteins and glycosaminoglycans). The present paper examines the action of glycosidases on glycoproteins.

Isolated rat kidney lysosomes degraded glycogen, starch, hyaluronic acid, ovomucoid, and fetuin. Studies on the release of N-acetylglucosamine from ovomucoid by lysosomes indicate that proteolytic activity aids in the degradation of the carbohydrate chain by glycosidases. Apparently a large portion of the N-acetylhexosamine residues in the ovomucoid are terminally located. The sequential action of sialidase, β-galactosidase, and β-N-acetylglucosaminidase releases monosaccharides from fetuin, fetuin glycopeptides, and modified fetuin. The author concludes that the results of these studies and previously published studies show that the lysosomes are the sites of intracellular catabolism of glycoproteins. [5 figures, 3 tables, 42 references]

 ABSTRACTER: F. T. Piskur

0.35 MITOCHONDRIAL RESEARCH TODAY

Hall, D. O., and J. M. Palmer (Department of Botany, King's College, London, England)
Nature 221, No. 5182, 717-723 (February 22, 1969)

Mitochondria have been recognized as the chief centers of cellular respiration in both plants and animals since the early 1900's. Isolated mitochondria or submitochondrial particles have been the primary source of information about the actual respiration mechanism. One of the three sections in the respiration process, the rearrangement and oxidation of carbohydrates to produce reduced coenzymes, is fairly well understood. The other two sections--oxidation of the coenzymes by molecular oxygen via the components of the respiratory chain and synthesis of adenosine triphosphate during oxidation of the coenzymes--are not.

Present techniques involving spectrophotometers, inhibitors, and radioactive compounds will continue to be used in investigations of the mechanism of oxidative phosphorylation. But increasingly sophisticated equipment (for example, rapid scanning spectrophotometers), very highly specific inhibitors (for example, tha alkyl guanidinium salts), extra-sensitive analytical techniques, and the use of artificial membranes and types of mitochondria other than those isolated from rat liver promise greater advances in our knowledge of the kinetic aspect of the phosphorylation reactions. [8 figures, 32 references]

 ABSTRACTER: L. Baldwin

0.5 SPORULATION, HEAT RESISTANCE, AND BIOLOGICAL PROPERTIES OF CLOSTRIDIUM PERFRINGENS

Nishida, S., N. Seo, and M. Nakagawa (Department of Bacteriology, School of Medicine, Kanazawa University, Kanazawa, Japan)
Applied Microbiology 17, No. 2, 303-309 (February 1969)

Previous workers found that certain food-poisoning strains of Clostridium perfringens collected in Britain were heat resistant but sporulated poorly in their medium, and other workers found that certain Cl. perfringens strains collected in the United States were not heat resistant but sporulated well. The purpose of the present study was to elucidate the nature of the heat-resistant strains of this species of bacteria and to determine the effects of heat selection on the biological properties of the microorganism.

A sporulation medium for 134 strains of Cl. perfringens, including Types A, B, C, D, E, and F, was devised. Sporulation took place most prominently when the organisms were precultured in a medium of 10 percent cooked-meat broth (pH 7.2) containing . percent Proteose Peptone and 1 percent glucose and subcultured in 2 percent Poli Peptone medium (pH 7.8). At times, terminal spores were observed. (over)

 ABSTRACTER: F. T. Piskur

0.117 (Cross Reference: 3.2493)

A METHOD FOR COLLECTION AND CONCENTRATION OF FISH VOLATILES

Keay, J. N., and A. S. McGill (Ministry of Technology, Torry Research Station, Aberdeen, Scotland)
Journal of Food Technology 3, No. 4, 345-351 (December 1968)

The paper describes a simple high-vacuum distillation technique for extracting volatiles from fish and subsequent concentration of the aqueous distillates by zone refining. The volatiles are concentrated up to 35-fold, thus their complete analysis by gas-liquid chromatography is facilitated.
[3 figures, 1 table, 5 references] [Abstracter: F. T. Piskur]

0.118 A LOW-COST VARIABLE-PROPORTION GAS-METERING SYSTEM

Tindle, Roger C. (Fish-Pesticide Research Laboratory, Bureau of Sport Fisheries and Wildlife, U.S. Fish and Wildlife Service, Columbia, Missouri 65201)
Analytical Biochemistry 26, No. 3, 477-480 (December 1968)

An inexpensive system for the precise metering of gas mixtures for laboratory use is described. Glass capillary tubes immersed in an ice bath regulate the flow of gas. The rate of flow of gas is controlled by the length of the capillary tube and the pressure of the gas. Flow rates obtained with this device range from 10 to 100 ml./min. [2 figures] [Abstracter: F. T. Piskur]

0.5

An examination was made of the sporulation of Cl. perfringens strains isolated from samples heated at different temperatures. Most of the strains isolated from unheated samples and from those heated at relatively low temperatures gave rise to spores in the sporulation medium, but the spores were weakly heat resistant. The strains isolated from samples heated at 100° C. for 60 min. were highly heat resistant but sporulated poorly. Most of the heat-resistant strains fermented salicin but did not hydrolyze gelatin.
[1 figure, 10 tables, 23 references]

0.9 DETERMINING YOUR NEED FOR R&D SERVICES

Bradshaw, Roy C. A. (Liberty Food Co., Barrington, Illinois)
Food Product Development 3, No. 1, 42, 43 (February-March 1969)

The question of whether a food company should set up a laboratory and a pilot plant is discussed. To find the answer, management must examine in logical fashion the function, costs, and advantages of a laboratory. A similar analysis must be applied to the question of establishing a pilot plant. Generally, the most acute need for a growing food firm is some system of quality control.
[Abstracter: F. T. Piskur]

0.110 ANALYTICAL INSTRUMENTATION--ITS ROLE IN THE FOOD INDUSTRY: PART II

Ulrich, W. F. (Scientific Instruments Division, Beckman Instruments, Inc., Fullerton, California)
Food Product Development 3, No. 1, 50-51, 54, 57, 59 (February-March 1969)

The paper is a brief description of the various analytical instruments and techniques used by the food industry. The various techniques considered are: activation analysis, magnetic resonance, mass spectroscopy, chromatography, electroanalysis, and differential thermal analysis. Complex instrument systems employing multiple analysis techniques, automation, and computer analysis are becoming more common as scientists probe further into the taste, texture, and shelf life characteristics of foods. [Abstracter: F. T. Piskur]

0.36 POSSIBLE ROLE IN CONTRACTION OF STRUCTURALLY BOUND PHOSPHATE OF MUSCLE

Cheesman, D. F., and Anne Whitehead (Department of Biochemistry, Bedford College, University of London, London, England)
Nature 221, No. 5182, 736-739 (February 22, 1969)

In 1965, as a result of experiments on the contraction with adenosine triphosphate of ^{32}P-labeled, glycerol-extracted, rabbit psoas fibers, the authors concluded that protein-bound phosphate groups undergo exchange or removal during muscular activity. In the present study, they attempted to gain further information about the nature of the effect and to test the validity of criticism of the earlier findings. Paired recti abdominis and sartorii of frog (Rana temporaria) were extracted much as were the muscles in the earlier tests, and the differences between the total phosphate contents of the extracted residues from relaxed and from contracted muscles were examined. The bound phosphate was found to be emphatically and immediately related to the contraction-relaxation cycle of the skeletal muscles. It seemed to be, though somewhat less conclusively, in combination with one of the myofibrillar proteins. [3 tables, 15 references]
[Abstracter: L. Baldwin]

0.5 LOW TEMPERATURE GROWTH OF TYPE E CLOSTRIDIUM BOTULINUM SPORES. 1. EFFECTS OF SODIUM CHLORIDE, SODIUM NITRITE AND pH

Emodi, A. S., and R. V. Lechowich (Department of Food Science, Michigan State University, East Lansing 48823)
Journal of Food Science 34, No. 1, 78-81 (January-February 1969)

Previous work has demonstrated that Type E Clostridium botulinum is distributed in many areas of the United States and that the organism can grow at relatively low temperatures. Accordingly, effective means of inhibiting low-temperature growth of Type E Cl. botulinum are necessary to maintain the public health safety record of our processed-food supply. The purpose of the present study was to determine the effect of sodium chloride, sodium nitrite, and pH on the low-temperature growth of seven Type E Cl. botulinum strains.

Two laboratory media were used to study spore outgrowth: trypticase-peptone-glucose and trypticase-peptone-sucrose-yeast. An inoculum of 1.0×10^6 spores/ml. was used. The pH of the media was adjusted with hydrochloric acid, and the range studied was from 5.2 to 6.6. To determine salt tolerance of the organism, sodium chloride was added to the media in the concentration range of from 2.0 to 5.0 percent. The effect of sodium nitrite was determined by the addition of 100 and 200 p.p.m. to the media. The test samples were incubated at 30°, 15.6°, 10°, 7.2°, 5.0°, and 3.4° C.

(over)

 ABSTRACTER: F. T. Piskur

0.5 LOW TEMPERATURE GROWTH OF TYPE E CLOSTRIDIUM BOTULINUM SPORES. 2. EFFECTS OF SOLUTES AND INCUBATION TEMPERATURE

Emodi, A. S., and R. V. Lechowich (Department of Food Science, Michigan State University, East Lansing 48823)
Journal of Food Science 34, No. 1, 82-87 (January-February 1969)

Bacteria require water for metabolism and growth. In earlier studies, the authors found that 4.87 percent (w/v) of sodium chloride in trypticase-peptone-sucrose-yeast (TPSY) extract medium inhibited the growth of Clostridium botulinum Type E strains at 15.0° and 10° C. At 7.2° C., from 4.17 to 4.6 percent sodium chloride was inhibitory; at 5.0° C., from 2.5 to 3.0 percent was inhibitory and was strain dependent. The purpose of the present study was to determine if the inhibition of outgrowth was a result of lowered water activity of the medium due to the added salt. (Water activity was used as a measure of the availability of water for microbial growth.)

The effects of water activity and osmotic phenomenon on the outgrowth of spores of Cl. botulinum Type E strains were examined by the addition of different concentrations of various solutes to a TPSY medium. Solutes used were sodium chloride, sodium formate, potassium chloride, sucrose, and glucose. Incubation temperatures were 30°, 21.2°, 15.6°, 10°, and 7.2° C. The equilibrium relative humidity of the media was measured by the graphical interpolation method and expressed as water activity. The molar (M) concentrations and osmotic pressures (calculated) of the different solutes were related to the approximate

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 ABSTRACTER: F. T. Piskur

0.7 NUTRITION AND LEARNING

Eichenwald, Heinz F., and Peggy Crooke Fry (Department of Pediatrics, University of Texas Southwestern Medical School, Dallas)
Science 163, No. 3868, 644-648 (February 14, 1969)

For years many behavioral characteristics of older children and adults have been ascribed to conditioning experiences undergone before birth or during infancy. Now data indicate that some of these conditioning factors have a biochemical rather than a psychosocial basis. The aspect of biochemical conditioning that has received the most attention is nutrition, for in most areas of the world, more deaths among children are traceable to malnutrition than to all other causes combined. From experimental data covering the long-term effects of malnutrition on animals, the authors advance a series of hypotheses relating to the profound and lasting disturbances produced by inadequacies in the biological and physical environment. The rationale is an understanding of the anatomical, chemical, and thus developmental and behavioral, pattern of human beings.

Malnutrition retards physical and neural growth, which, in turn, affects intellectual and emotional development. If growth is retarded long enough during a critical phase in the early weeks or days of life, the child will never attain normal maturity, even though the later diet is brought up to adequacy. Delay in the maturation of biochemical processes--for example, the metabolism of phenylalanine to tyrosine in infants, and the ability to metabolize aromatic amino acids in older children--may cause the child to revert to functional patterns

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 ABSTRACTER: L. Baldwin

0.8 COOKER EXTRUDERS IN SERVICE OF WORLD FEEDING

De Muelenaere, H. J. H., and J. L. Buzzard (ProNutro Research Division, Hind Bros. and Co., Ltd., 1188 Umbilo Road, Durban, South Africa)
Food Technology 23, No. 3, 71-77 (March 1969)

Considerable effort has been expended on developing high protein foodstuffs to alleviate malnutrition. Only two products have been successfully produced and marketed commercially--"Incaparina" and "Pronutro." The purpose of the present study was to examine the possible use of extruder cookers for processing high protein foods. Various raw materials were used: degermed corn, whole corn, peanuts, sorghum, defatted soya, full fat soya, and oats. [Although grain-based materials were used in the tests, fish processors may find the results useful in application of extruder equipment to fish-based materials.] Data were obtained on protein-supplemented foods produced with two different extruders, the Sprout Waldron 50-hp. model and the Wenger X-25.

The cooker extruders produced a bacteriologically sound product even when the raw material was heavily contaminated. The Sprout Waldron destroyed trypsin inhibitor in soybean products to the same extent as the autoclave did. Destruction of vitamin A and vitamin C during cooker extrusion of a corn-soybean-peanut mixture was significant; destruction of niacin was minor. Reduction in available lysine ranged from 0 to 28 percent, depending upon the raw material and the extruder used. Available lysine was reduced by 28 percent during extrusion of a skim-milk-containing product through the Sprout Waldron extruder.

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 ABSTRACTER: F. T. Piskur

0.5 (Cross References: 2.05, 3.12)

inhibitory concentrations of 5.0 percent sodium chloride, 6.0 percent potassium chloride, 5.5 percent sodium formate, 38.5 percent sucrose, and 22.5 percent glucose.

The concentration of the salts in TPSY for inhibition of growth of the spores was approximately 0.80 M (osmotic pressure of about 36.0 atmospheres). The inhibitory concentration of sucrose was 1.12 M (osmotic pressure, 25.08 atmospheres) and of glucose, 1.24 M (osmotic pressure, 27.97 atmospheres). Growth response decreased as the temperature of incubation decreased.
[1 figure, 8 tables, 6 references]

0.5 (Cross References: 2.05, 3.12)

Outgrowth of all strains tested was inhibited in the media with pH of 5.2 incubated at 15.6° C.; inhibition of growth of the strains also occurred in the media with higher pH that were incubated at lower temperatures. None of the strains showed outgrowth in the media containing 4.87 percent sodium chloride at any of the incubation temperatures used. Addition of 100 or 200 p.p.m. of sodium nitrite to the media inhibited outgrowth of four of six strains tested.

The authors postulate that acidification to pH 6.5, coupled with the use of 5 percent salt and up to 200 p.p.m. of sodium nitrite, should render a fish product stored at 10° C. or lower a poor substrate for the growth of Type E Cl. botulinum. [4 figures, 9 references]

0.8 (Cross Reference: 6.54)

The authors conclude that products containing protein of high nutritive value and having good taste appeal can be produced economically using cooker extruders. However, they point out that use of cooker extruders for these types of products is relatively new and that people entering the field should be prepared to invest considerable time and research effort in developing suitable products because each formulation will present its own production and quality problems. [2 figures, 12 tables, 14 references]

0.9 THE BASIC RESEARCH NEED--DETERMINING WHAT TO DEVELOP

Karger, Theodore (The Nowland Organization, Inc., Greenwich, Connecticut)
Food Product Development 3, No. 1, 34 (February-March 1969)

A link between the consumer and new-product planners should be built at the outset of the planning, for the probability of success is greater if product development is consciously addressed to consumer needs and wishes.

[Abstracter: F. T. Piskur]

0.7

characteristic of younger children or to show defects closely resembling those associated with certain inborn errors of metabolism.

Protein-calorie malnutrition in human infants results in behavioral changes, a lowered capacity to learn at a later age, susceptibility to marasmus and kwashiorkor, a lack of emotional responsiveness, and consistent abnormalities in the form, frequency, and amplitude of the electrical activity of the brain. Animal experiments have demonstrated that the offspring of animals suffering the effects of protein-calorie deprivation exhibit the same incapacity to learn as their mothers do. Although children may be treated for clinically severe protein-calorie malnutrition, they never completely catch up with their healthy peers physically or intellectually.

Whether these results are caused by malnutrition alone or whether such intimately related factors as infection and an inadequate social and emotional environment contribute significantly to the problems are some of the long-range questions facing investigators. More immediate questions involve the effects of nutrition on the physiological processes of nervous tissue and the relation between mentation and cellular metabolism. Tests to find the answers are difficult to design and give. The results may be equally hard to interpret, for the interpretation involves a consideration of the political and social forces behind many dietary traditions. Only by recognition of these forces can positive steps be taken to reduce the high incidence of malnutrition in many areas of the world.
[34 references]

1.0116 DEMERSAL FISH RESOURCES: COMPOSITION, DISTRIBUTION, AND COMMERCIAL POTENTIAL OF THE CONTINENTAL SHELF STOCKS OFF SOUTHEASTERN UNITED STATES

Struhsaker, Paul (Hawaii Institute of Marine Biology, University of Hawaii, Honolulu 96822)
Fishery Industrial Research 4, No. 7, 261-300 (March 1969)

A 5-year study of the demersal fish resources of the Continental Shelf off Southeastern United States resulted in the occupation of 956 exploratory trawling stations in the 6- to 100-fathom depth range. The study showed that the region can be divided into five general habitat types--coastal, open-shelf, live-bottom, shelf-edge, and lower-shelf--each harboring a distinctive association of demersal fishes.

The coastal habitat, which has a smooth, sandy-mud bottom out to depths of 8 to 10 fathoms, has well-known and abundant resources of bottomfishes. Increased use of these stocks (mostly drums and croakers) seems to depend on market development, rather than on additional exploratory fishing.

The open-shelf habitat, which has a smooth sand bottom to depths of about 10 to 25 or 30 fathoms, has poor potential for a trawl fishery for food fishes. Occasional large catches of scup and filefish indicate, however, that these species may be abundant enough to support a small industrial fishery for bottomfish.

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 ABSTRACTER: F. T. Piskur

1.80 KRILL...ITS OCCURRENCE AND POSSIBLE COMMERCIAL VALUE

Gilberg, Y. C. (Food Technology Department, Massey University, Palmerston North, N.I., New Zealand)
Commercial Fishing 7, No. 12, 22-26 (December 1968)

The water that forms the gigantic upwellings in the Antarctic is unusually rich in such inorganic nutrients as sulfate, magnesium, potassium, iron, manganese, nitrogen, and phosphorus. It also contains traces of many organic substances that are essential to growth. In the summer, its temperature is between 4.0° and 1.5° C.; in the winter, between 1.5° and 0°. As a result of these factors, it forms a unique ground for the production of plankton. Chemical analyses have shown that the proportion of protein to total organic matter in the phytoplankton is higher than in land plants and that the proportion of fatty material is substantial. As for the many zooplankton that inhabit the area, the dominant species is krill (Euphausia superba), the almost exclusive diet of the whalebone whale. The exceptionally high growth rate of whales (some 350 percent in about 4 years) attests to the rapid conversion of krill to whale meat. This conversion phenomenon, along with the intense scientific activity that is building up in the Antarctic, makes research into the commercial harvesting of krill feasible.

From January to March 1964, the Russians tested the effectiveness of harvesting krill with a fish pump and a 31-meter midwater trawl. They found that krill

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 ABSTRACTER: L. Baldwin

2.05 SOME METABOLIC EFFECTS OF BACTERIAL ENDOTOXINS IN SALMONID FISHES

Wedemeyer, Gary, and A. J. Ross (Western Fish Disease Laboratory, Bureau of Sport Fisheries and Wildlife, U.S. Naval Air Station, Seattle, Washington 98115), and Lynwood Smith (University of Washington, College of Fisheries, Seattle 98105)
Journal of the Fisheries Research Board of Canada 26, No. 1, 115-122 (January 1969)

The purpose of the study was to determine the response of salmonids to bacterial endotoxins as indicated by liver glycolytic activity, tryptophan pyrrolase activity, and the effect on arterial blood pressure. The endotoxins used were lipopolysaccharide B (Escherichia coli) and an endotoxin extracted from Aeromonas salmonicida, a fish pathogen. Coho salmon (Oncorhynchus kisutch) and rainbow trout (Salmo gairdneri) were used as the test subjects, since A. salmonicida is pathogenic for both.

Coho salmon and rainbow trout were resistant to endotoxins from E. coli and A. salmonicida at water temperatures of 14° and 18° C. Both endotoxins accelerated liver glycogen depletion (in vitro) but produced no significant cardiovascular response or effect on liver tryptophan pyrrolase activity. Inasmuch as the cardiovascular effects of histamine were also limited, the authors concluded that the metabolic effects of bacterial endotoxins in salmonids are quantitatively different from those of higher vertebrates.
[4 figures, 6 tables, 15 references]

 ABSTRACTER: F. T. Piskur

2.1121 DESIGN, CONSTRUCTION, AND FIELD TESTING OF THE BCF [BUREAU OF COMMERCIAL FISHERIES] ELECTRIC SHRIMP-TRAWL SYSTEM

Seidel, Wilber R. (Exploratory Fishing and Gear Research Base, Bureau of Commercial Fisheries, U.S. Fish and Wildlife Service, P.O. Box 1207, Pascagoula, Mississippi 39567)
Fishery Industrial Research 4, No. 6, 213-231 (February 1969)

Brown and pink shrimp burrow into the substratum during the day but emerge at night. Fishing is done only at night when the shrimp can be captured by conventional trawl gear; round-the-clock fishing would allow more economic use of men and equipment. The purpose of this study was to develop a method of forcing the shrimp out of their burrows so that shrimp trawling could be carried out during the day, as well as at night. This paper reports on the development and evaluation of a prototype electric trawl for fishing for shrimp during daylight.

A pulse generator was developed that would produce 3 volts across 4 inches of sea water--the characteristics of an electric field necessary to force shrimp out of their burrows. The electric field was produced by five 25-foot-long electrodes in an 8-foot-wide array so designed that it would not interfere with the operation of a 40-foot flat shrimp trawl moving at 2.5 knots. A silicon controlled rectifier was used to control the power-discharge pulses of the pulse

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 ABSTRACTER: F. T. Piskur

1.80 (Cross References: 3.235, 3.335)

occur in commercial quantities in the surface layer down to depths of 27 fathoms. The krill can be caught at trawling speeds of from 2.0 to 2.5 knots; a twin trawl is effective on both surface and deep accumulations. The catch can be removed from both side and twin trawls with a hydraulic lift. Although the krill react positively to above-water red light and to a homogenous electric field of direct current, their reaction to the passage of a ship through their midst or to a moving net is insignificant.

In April 1968, the United States Navy made a large catch of krill with a 10-foot Isaacs Kidd midwater trawl towed for 4 min. at about 3 knots. A 600-lb. sample from the catch was frozen at -20° F. and sent to Massey University for analysis. The author's most striking impression of the specimens was their intense fresh-crustacean odor and their attractive color. Their proximate composition was found to be 77.8 percent moisture, 15.5 percent crude protein, and 4.9 percent fat; the ratio of soluble to total protein nitrogen was 52.6 percent. Because of the krill's physical characteristics, food technologists at Massey decided to concentrate on developing seafood-flavoring agents from the krill material. A puree, an essence, and a freeze-dried powder were the result. Special products were also developed incorporating the flavoring agents--for example, a cheese spread and a prepared sauce that can be used by caterers in fish and crayfish dishes and by canners in canned fish products lacking a characteristic or attractive flavor of their own. These agents are also suitable for use in home-cooked dishes.

The author states that he has little doubt that krill has a promising potential for improving the palatability of fish prepared for human consumption.

1.0116

The live-bottom habitats, which are small areas of broken relief and a rich sessile invertebrate fauna within the open-shelf habitat, have the best food-fish potential for commercial utilization. During exploratory fishing, moderate to large catches of snappers, groupers, porgies, and ecologically associated species were taken consistently with New England-type otter trawls. The best areas were off Northeastern Florida and South Carolina, but other productive areas were found along most of the Southeastern Coast.

The shelf-edge habitat, which has a smooth to highly broken bottom and runs along the edge of the Continental Shelf at depths of about 30 to 60 fathoms, also has large concentrations of snappers, groupers, and porgies in certain localities. Although trawling was often impractical in the rougher portions of this habitat, the fishery resources of these areas can be harvested by handlines and traps.

The lower-shelf habitat has a smooth mud bottom from about 60 to at least 100 fathoms; the limited explorations indicate the presence of large concentrations of butterfish, spotted hake, and perhaps groupers in this habitat.

A fishing log and chart of 50 stations where catches of commercial size were made is provided. A list of demersal fishes taken during the explorations is given, along with notations on their occurrences in the trawl catches and habitat occupation. [12 figures, 8 tables, 48 references]

2.1121 (Cross Reference: 2.143)

generator. The switch is turned on by means of a standard unijunction transistor trigger circuit; it is turned off by means of an oscillation unit.

In fishing trials off the coasts of Mississippi and Texas, where the substratum is mud, the prototype electric trawl caught during daylight 109 and 95 percent, respectively, of the quantity of shrimp caught at night by a conventional (nonelectric) trawl. In the Dry Tortugas area off Southern Florida, where the substratum is calcareous sand-shell, the catch with the electric trawl during daylight was 50 percent of that taken with the conventional trawl at night. [10 figures, 4 tables, 4 references]

2.1121 ON THE RESISTANCE OF VARIOUS COD-ENDS FIXED IN A STREAM--VI

Taniguchi,Takeo (The Shimonoseki University of Fisheries, Shimonoseki, Japan) Bulletin of the Japanese Society of Scientific Fisheries 34, No. 11, 979-982 (November 1968) (In Japanese; summary, figures, and tables in English)

The towing lines of nine different types of net were shortened by 30 percent, and the hydrodynamic resistance of the cod-ends was measured in a model stream. The results were compared with formula-derived values obtained by the author in 1955 and with values from earlier experiments in 1968, during which the towing lines were not shortened. [2 figures, 2 tables, 3 references]

[Abstracter: L. Baldwin]

2.113 (Cross References: 2.15, 3.18)

CARE OF FISH HOLDS

Tretsven, Wayne I. (Technological Laboratory, Bureau of Commercial Fisheries, U.S. Fish and Wildlife Service, Seattle, Washington 98102)
Fishery Industrial Research 4, No. 6, 233-239 (February 1969)

The stowage of iced fish in the hold of a fishing vessel causes the hold to become wet and dirty, which in turn may cause deterioration of the vessel. This article reports on the development and application of techniques for taking care of fish holds.

The article suggests cleaning with detergents--steam cleaning was not recommended for wooden holds. It suggests, further, that sanitizing treatments with hypochlorite solution or other approved chemicals are helpful.

The article suggests the use of a fungicide (solubilized copper-8-quinolinolate) to preserve the wood in wooden holds.

Finally, it describes the use of plastic sheeting, 6 mils thick, to line the fish hold in order to prevent the hold from becoming wet and dirty.
[3 figures, 2 references] [Abstracter: F. T. Piskur]

2.1123 A PRELIMINARY REPORT ON HAULING SPEED OF TUNA LONGLINE

Maeda, Hiroshi, Shiro Minami, and Masami Nishino (Shimonoseki University of Fisheries, Shimonoseki, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 34, No. 11, 1009-1014 (November 1968)

A tuna longline consists of many consecutively arranged sections, usually of uniform length and structure. Although hauling the sections should be simple and repetitious, the time required varies from section to section. As a result, the work load on a tuna boat is irregular and extra hands are sometimes needed. Because hauling consumes such a large portion of the work day and because hauling speed can have a major effect on the fishing capacity of the boat, the factors that cause variations in the hauling speed are of economic significance to fishermen.

For this preliminary report, the authors examined the records kept during a training cruise of a tuna longliner fishing east of Australia from November 20 to 28, 1966. The vessel was equipped with a Model 6 Izui line hauler. The mainline of each section of the longline was 225 m. long, had five 18.5-m.-long branchlines, and was made of resined polymeric fiber. The hauling speed of 1,910 sections (measured from the time one juncture between mainlines passed through the line hauler till the next juncture passed through) was timed in minutes. The character of the catch, the condition of the weather, and the operational differences of the boat's two skippers were noted.

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ABSTRACTER: L. Baldwin

3.15 PRESERVATION OF FRESH UNFROZEN FISHERY PRODUCTS BY LOW-LEVEL RADIATION. 6. OPTIMUM RADIOPASTEURIZATION DOSE STUDIES ON OCEAN PERCH, POLLOCK, AND COD FILLETS

Ampola, Vincent G., Thomas J. Connors, and Louis J. Ronsivalli (Bureau of Commercial Fisheries Technological Laboratory, U.S. Fish and Wildlife Service, Gloucester, Massachusetts 01930)
Food Technology 23, No. 3, 83-85 (March 1969)

The purpose of this study was to determine the optimum radiopasteurization dose levels for fillets of ocean perch (Sebastes marinus), pollock (Pollachius virens), and cod (Gadus morhua). The optimum irradiation dose level for the raw fillets was arbitrarily defined as the lowest level of gamma radiation absorbed that yielded a product the least different in organoleptic qualities from a nonirradiated high-quality reference sample and that remained of acceptable quality for at least 30 days [at 1° C.].

The optimum radiation-pasteurization dose level for pollock and cod fillets was 150 kilorads; for ocean perch fillets, the optimum dose level was 250 kilorads. Radiation-pasteurized fillet samples had twice the shelf life when stored at 1° C. as did the samples stored at 5.5° C. Vacuum packing the pollock fillets prior to irradiation had no effect on the subsequent keeping quality; vacuum packing the cod fillets had an adverse effect on the keeping quality. Vacuum

(over)

ABSTRACTER: F. T. Piskur

2.3 OPENING OYSTERS AND OTHER BIVALVES USING MICROWAVE ENERGY

Mendelsohn, Joseph M., Louis J. Ronsivalli, Frederick J. King, Joseph H. Carver, Robert J. Learson, Barry W. Spracklin (Bureau of Commercial Fisheries Technological Laboratory, U.S. Fish and Wildlife Service, Gloucester, Massachusetts 01930), and Ernest M. Kenyon (Process and Development Division, Food Laboratories, U.S. Army Natick Laboratories, Natick, Massachusetts 01760)
Fishery Industrial Research 4, No. 7, 241-248 (March 1969)

Oysters and other bivalves that are hard to open have been successfully opened with microwave energy. The method can be adapted both to a batch-type and to a continuous-type commercial process without noticeably changing the organoleptic quality of the shellfish. Hence, after being processed by this method, oysters, for example, can still be sold raw on the half-shell. A comparison of costs with the hand-shucking method shows that a 33-percent saving can be realized using microwave energy. The method also has other advantages, such as increasing the productivity of a plant, enabling labor to be recruited more easily, lowering accident rates, and resulting in a product free from shell fragments. [5 figures, 2 tables, 3 references]

AUTHORS' SUMMARY

3.15 EFFECT OF PREIRRADIATION QUALITY OF EVISCERATED HADDOCK ON POSTIRRADIATION SHELFLIFE OF FILLETS

Ampola, V. G., and L. J. Ronsivalli (Bureau of Commercial Fisheries, Technological Laboratory, U.S. Fish and Wildlife Service, Gloucester, Massachusetts 01930)
Journal of Food Science 34, No. 1, 27-30 (January-February 1969)

The purpose of this study was to determine the effect of radiopasteurization of fillets prepared from fish of varying marketable quality on the shelf life of the fillets. Haddock (Melanogrammus aeglefinus) fillets were given 250 kilorads of radiation, then stored at 33°-35° F.

The shelf life of the haddock fillets was extended by the radiopasteurization treatment provided the fillets were acceptable at the time of irradiation. The irradiated fillets prepared from high-quality fish had a longer shelf life than did the irradiated fillets prepared from low-quality fish.
[2 tables, 11 references]

ABSTRACTER: F. T. Piskur

2.9 CONDYLACTIS TOXIN: INTERACTION WITH NERVE MEMBRANE IONIC CONDUCTANCES

Narahashi, Toshio, and John W. Moore (Department of Physiology and Pharmacology, Duke University Medical Center, Durham, North Carolina), and Bert I. Shapiro (Biological Laboratories, Harvard University, Cambridge, Massachusetts)
Science 163, No. 3868, 680-681 (February 14, 1969)

In 1966, Shapiro found that the toxin from the Bermuda anemone Condylactis gigantea caused the action potential from the giant axons of lobster or from the slow-adapting stretch receptors of crayfish to be greatly prolonged, forming a plateau similar to that occurring in cardiac tissues. He hypothesized that the slowing of the turn-off process of the membrane sodium conductance caused the prolongation. In evaluating this hypothesis, the present authors found that Condylactis toxin applied to the giant axons of crayfish slowed the turn-off of the early transient conductance without affecting the turn-on. It either did not affect, or only slightly suppressed, the increase in late steady-state conductance. The effect of the toxin on the conductance components, then, adequately accounts for prolongation of the action potential in the crayfish axons.
[1 figure, 16 references] [Abstracter: L. Baldwin]

3.15 (Cross Reference: 0.8)

DESIGNING FOR LOWER FOOD-IRRADIATION COSTS

Huff, John B. (Bureau of Commercial Fisheries Technological Laboratory, U.S. Fish and Wildlife Service, Gloucester, Massachusetts 01930)
Isotopes and Radiation Technology 6, No. 2, Section 3, 154-162 (Winter 1968-1969)

The report describes the design of a simple compact irradiator for shellfish for use as a pilot plant. Estimated cost of irradiation treatment was about 1.6 cents per pound of shellfish under typical processing conditions.
[6 figures, 2 tables, 5 references] [Abstracter: F. T. Piskur]

2.1123

The time needed to haul one section varied from 1 to 6 min.; 63.7 percent of the sections were hauled in 1 min., 34.1 percent in 2 min., and the remaining 2.2 percent in from 3 to 6 min. Hauling time for commercially valuable fish and for fish that were large or inclined to struggle was longer than for trash and quiet fish--the time needed for albacore averaged about 20 sec.; for yellowfin, bigeye, and shark, 40 sec.; and for marlin, between 1 and 2 min., depending on species and size. Quiet trash fish had little effect on hauling speed. The frequency of the stops made during hauling increased with catch. Variations in wind speed from 2 to 9 m./sec. had no effect on hauling speed, nor did changes in skipper.

The hauling speed showed a three-section periodicity; neither the distribution of the catch nor the tautness of the mainline showed the same periodicity. This lack of correlation, along with the fact that some sections bearing hooked fish could be hauled in 1 min. whereas other sections bearing no fish required 2 min., suggested that the time-measuring intervals that were used were too broad to give reliably valid results. The authors note the necessity of measuring time in seconds, or at least in 10-sec. increments, during future tests. They also note that a broad spectrum of influences may affect hauling speed: the maneuverability of the boat, the height of the freeboard, the position and operational characteristics of the line hauler, the skill and temperament of the skipper, the relative direction and speed of the wind, the construction of the gear, as well as the character and distribution of the catch. [6 figures, 1 reference]

3.15

packing the ocean perch fillets prior to irradiation seemed to enhance the keeping quality of the fillets so that the optimum irradiation dose level for the vacuum-packed fillets was 150 kilorads.

In another test, fillets from each species of fish were deep-fat fried, radiopasteurized at their optimum dose levels, then stored at 1° C. After 30 days' storage, these prefried radiation-pasteurized samples were as acceptable as the nonirradiated control samples. [2 tables, 4 references]

3.231 CRYOGENIC REFRIGERATION SYSTEM

United States Patent 3,422,632
Currie, Robert B. (Bethlehem, Pa.), Martin S. Sellinger, and Henry F. Villaume
Air Products and Chemicals, Inc., Philadelphia, Pa.
Quick Frozen Foods 31, No. 7, 14 (February 1969)

The cryogenic system described lowers temperatures to below -450° F. in stages. A succession of normally gaseous refrigerants is used in descending order of their boiling points. The first refrigerant is supplied to the system in the liquid phase, and the rest are supplied in the gaseous phase from pressurized sources at ambient temperature. A preferred group of refrigerants for a three-stage system would be nitrogen, hydrogen, and helium, supplied to the system in that order.

The system includes a Dewar flask, which provides a reservoir for the liquid refrigerant, and an elongated, dependent heat-exchanger core, which is surrounded by a radiation shield and a shroud. A continuous insulating vacuum surrounds the Dewar reservoir and extends the full length of the heat-exchanger core on both

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 ABSTRACTER: L. Baldwin

3.2493 LIPID HYDROLYSIS IN FROZEN BALTIC HERRING

Bosund, Ingmar, and Bertil Ganrot (Nordreco AB, Bjuv, Sweden)
Journal of Food Science 34, No. 1, 13-18 (January-February 1969)

Earlier studies seem to indicate a relation between hydrolytic changes in lipids and protein denaturation in frozen fish. Information, then, on hydrolytic changes in the lipids of fish stored below 0° C. would be useful in the technology of the freezing and storing of fish. The present paper reports on the hydrolysis of the lipids of both the dark and the white muscle of the Baltic herring (Clupea harengus var. membranus). The fish fillets were stored at -15° C. The lipid composition of the herring muscle and the hydrolysis during storage were studied using thin-layer chromatography.

The amounts of the various lipid classes (triglyceride, cholesterol + cholesterol esters, free fatty acid, lecithin, ethanolamin cephalin + serin cephalin, diphosphatidyl glycerol, and unidentified phospholipids) were 2 to 5 times as great in dark muscle as in white muscle. After 12 weeks of storage of the samples at -15° C., the free fatty acid (FFA) increased from 50 to 1,000 mg./g. in the dark muscle and increased from 17 to 280 mg./g. in the white muscle. The increase in FFA was due to the hydrolysis of lecithin, cephalin, and, to a varying extent, triglycerides. About 45 percent of the FFA in the dark muscle and 75 percent in the white muscle apparently are formed by the hydrolysis of phospholipids. Lecithin hydrolyzed faster than cephalin did in both types of muscle.

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 ABSTRACTER: F. T. Piskur

3.2495 DETERIORATION OF FRESH-WATER WHITEFISH MUSCLE DURING FROZEN STORAGE AT -10° C.

Awad, A. (Department of Food Science, University of Cairo, Cairo, Egypt), W. D. Powrie, and O. Fennema (Department of Food Science and Industries, University of Wisconsin, Madison 53706)
Journal of Food Science 34, No. 1, 1-9 (January-February 1969)

The article reports on the deterioration in the muscle of the fresh-water whitefish (Coregonus clupeaformis) during storage at -10° C. The storage temperature of -10° C. was selected because product temperature may rise to this level during commercial distribution. Use of this particular storage temperature level, then, allows a realistic appraisal of the effect of adverse storage conditions on the quality of frozen fresh-water fish.

Samples of whitefish muscle were frozen at and stored at -10° C. Assessments of the deterioration of the muscle were made organoleptically and chemically at periodic intervals for up to 16 weeks.

The toughness and the rancidity of the baked muscle (the samples were cooked for the organoleptic observations) increased as frozen storage time progressed. The amount of myofibrillar protein (measured on a total protein basis) decreased from 72 percent to 22 percent during the 16 weeks of storage of the whitefish muscle.

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 ABSTRACTER: F. T. Piskur

3.33 COMPUTER DETERMINATION OF SPORE SURVIVAL DISTRIBUTIONS IN THERMALLY-PROCESSED CONDUCTION-HEATED FOODS

Teixeira, Arthur A., John R. Dixon, John W. Zahradnik, and George E. Zinsmeister (Departments of Agriculture Engineering and Mechanical and Aerospace Engineering, University of Massachusetts, Amherst 01003)
Food Technology 23, No. 3, 78-80 (March 1969)

A new computer method was used to observe the effect of can size, lethal rate, and processing conditions on the location of greatest bacterial survivors and spore concentrations in cylindrical containers of conduction-heated foods. Three container sizes were considered: No. 10 can (603 x 700), No. 2 can (307 x 409), and a tuna-fish can (211 x 109).

The number of bacteria surviving a given thermal process in food in a No. 10 can would be greatest on the mid-plane at a distance approximately one-fourth the radius from the center line. This location will vary with the geometry [size and shape] of the container and with processing conditions. Spore concentration was greatest near the center for the three can sizes.

The authors concluded that the location that spoilage would most likely first occur within a cylindrical container of food is not the center. However, spoilage will more likely occur in a given quantity of food taken from the center region of an inadequately processed container than in food taken from any other location in the container. [5 figures, 1 table, 3 references]

 ABSTRACTER: F. T. Piskur

3.336 (Cross Reference: 0.6)

TEMPERATURE PROFILING OF FOOD PROCESSING EQUIPMENT BY RADIO TELEMETRY

Butterworth, T. A., and D. F. Farkas (Western Utilization Research and Development Division, Agricultural Research Service, U.S. Department of Agriculture, Albany, California 94710)
Food Technology 23, No. 3, 81-82 (March 1969)

Foods must be heated to specific temperatures to insure proper pasteurization, sterilization, blanching, or drying. However, measurement of temperature in closed or continuous equipment may be difficult or impossible by conventional means. The authors describe a simple telemetering transmitter that can be used to provide a continuous temperature profile during processing, even in sealed continuous retorts. Signals from the transmitter are pulsed at a rate proportional to the temperature. Signals will be carried through the sealed equipment by an antenna made of insulated wire and may be picked up on the broadcast band of an AM radio.

The authors used the radio telemeter to measure the exit airstream temperature of a centrifugal fluidized bed drier during the drying run of diced potato. Telemetered air temperature values agreed closely with air temperatures calculated from a heat balance on the drying potato. A commercial unit is available for temperature telemetry up to 150° C. It can be used, with appropriate accessories, to measure the temperature inside cans during continuous retorting and to follow drying and blanching temperatures in continuous equipment.
[3 figures, 2 references] [Abstracter: F. T. Piskur]

3.2493

The enzymatic attack showed no preference for any of the different fatty acids in the phospholipids. [4 tables, 6 figures, 25 references]

3.231 LOW-TEMPERATURE FISH STORAGE FACILITY WITH PRECISE TEMPERATURE CONTROL

Scott, K. R. (Fisheries Research Board of Canada, Freshwater Institute, Winnipeg, Manitoba)
Journal of the Fisheries Research Board of Canada 26, No. 1, 154-161 (January 1969)

The cold-room complex recently installed at the Freshwater Institute Laboratory at Winnipeg features several novel design aspects. These aspects include: foamed-in-place urethane insulation, two completely independent refrigeration systems incorporating automatic safety switch-over and adjustable defrost, "straight-line" pneumatic temperature control, hot gas bypass control, and a master control panel. [5 figures, 1 reference] [Abstracter: F. T. Piskur]

3.231

sides of the radiation shield. If necessary, adsorbers may be used to purify the gaseous refrigerants--warm adsorbers for preliminary, external removal of water; cold adsorbers for subsequent, internal removal of solid contaminants.

At spaced locations along the heat-exchanger core, the gaseous refrigerants are separately and progressively liquefied by the Joule-Thomson cooling effect. At these locations, the liquefied refrigerants are kept individually as a liquid pool. The refrigerant having the lowest boiling point is liquefied and accumulated in the lowest end of the unit. This part of the unit is the refrigeration zone; it contains the specimen to be cooled.

In operation, the unit makes optimum use of indirect heat exchange between the downward and upward flowing streams of refrigerants--from the gaseous phase, to the liquid phase (achieved by the Joule-Thomson effect), and back to the gaseous phase (resulting from the boil-off of accumulated liquid). Maximum use is also made of the liquid refrigerant, for it serves as a coolant for the incoming gaseous refrigerants, the cold adsorbers, the radiation shield, and the specimen to be cooled.

3.2495

The sarcoplasmic protein showed no change in solubility. Water-binding capacity of the frozen muscle decreased as time of storage increased. The total lipid and cholesterol content of the muscle remained constant during the storage period; the phospholipid content decreased as the free fatty acid content increased.
[3 figures, 6 tables, 64 references]

3.9 PHENOXYETHANOL: PROTEIN PRESERVATIVE FOR TAXONOMISTS

Nakanishi, Mikiye, Allan C. Wilson, Richard A. Nolan, George C. Gorman, George S. Bailey (Department of Biochemistry and Museum of Vertebrate Zoology, University of California, Berkeley)
Science 163, No. 3868, 681-683 (February 14, 1969)

Traditionally zoologists have preserved animal tissues by fixing them in 4 percent formaldehyde and storing them in 70 percent ethanol. However, this treatment denatures the proteins, the molecules that are most useful to the biochemical taxonomist. The present authors have found that 2-phenoxyethanol (also known as phenoxetol and as ethylene glycol monophenyl ether) will prevent bacterial and fungal growth yet permit the survival of native proteins for several weeks at room temperature. The physical, catalytical, and immunological properties of the surviving proteins seem to be identical with those of fresh tissues.
[1 figure, 18 references] [Abstracter: L. Baldwin]

3.3342 CAUSES OF CAN SWELLING AND BLACKENING OF CANNED BABY CLAMS. 3. BACTERIOLOGY AND CHEMISTRY OF SEA-BOTTOM MUD INVOLVED IN CAN SPOILAGE

Tanikawa, Eiichi, Terushige Motohiro, and Minoru Akiba (Laboratory of Marine Food Technology, Faculty of Fisheries, Hokkaido University, Hakodate, Hokkaido, Japan)
Journal of Food Science 34, No. 1, 88-92 (January-February 1969)

The paper reports on (1) a study of the distribution of bacteria and of the chemical composition of the muds taken from the sea-bottom habitat of clams and (2) an examination of the relation between the bacteriological and chemical characteristics of sea-bottom mud and the swelling and blackening of the clams taken from the particular habitat and canned. The mud and clams were taken from the Ariake Sea in Kyushu, Japan.

Spores of various bacteria grown in a medium containing calcium chloride were found to be thermoresistant. Canned clams prepared from clams taken from sea-bottom muds with high calcium content usually spoiled. Sea-bottom muds high in calcium may have an effect upon the thermoresistance of bacterial spores. There was no correlation between the iron and magnesium content of the mud and the spoilage of the canned clam product. The amount of hydrogen sulfide in the sea-bottom mud was directly proportional to the amount of organic matter and humus.
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 ABSTRACTER: F. T. Piskur

4.92 TOXIC COMPONENTS OF OXIDIZED SAURY OIL INDUCING MUSCULAR DYSTROPHY IN CARP

Watanabe, Takeshi, and Yoshiro Hashimoto (Laboratory of Marine Biochemistry, Faculty of Agriculture, The University of Tokyo, Tokyo, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 34, No. 12, 1131-1140 (December 1968) (In English)

In 1966, Watanabe et al. postulated that muscular dystrophy in carp fed oxidized saury oil might be caused by oxidation products other than peroxides. In the present study, the authors attempt to identify the causative substances.

Three fractions of glycerides obtained from oxidized saury oil by liquid-partition chromatography were examined for toxicity. Fraction 1, which consisted entirely of unoxidized monomeric acids, caused no sign of muscular dystrophy in the carp to which it was fed; fractions 2 and 3, both of which contained some oxidized fatty acid moieties, induced a typical pathology of dystrophy.

The fatty acids obtained from a mixture of fractions 2 and 3 were chromatographically fractionated into monomers, dimers or polymers, and secondary products; then methyl esters were derived from the chromatographically produced fractions and fed to carp. Carp fed the methyl ester of the monomers developed conspicuous atrophy of the connective tissues of the myoseptum; those fed the methyl ester of the dimers exhibited a prominent disarrangement of muscle fibers
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 ABSTRACTER: L. Baldwin

4.15 HYDROCARBONS AND ALCOHOLS OF BASKING SHARK AND PIG LIVER LIPIDS

Gershbein, Leon L., and Eric J. Singh (Biochemical Research Laboratories, Northwest Institute for Medical Research, Chicago, Illinois 60634)
Journal of the American Oil Chemists' Society 46, No. 1, 34-38 (January 1969)

Saturated hydrocarbons occur in many animals and are components of scalp and hair lipids. As these saturated hydrocarbons of sebum occur together with large amounts of squalene, a study of other natural mixtures of lipids high in this component--such as those in the liver oil of basking shark--would present a variety of paraffinic hydrocarbons for correlative analysis.

Previous studies on the liver lipids of basking shark indicated that there was little structural alteration in the hydrocarbons of zooplankton on which the shark fed, and the hydrocarbon distribution served as an index of the food source and the feeding grounds of the animal. The amount of squalene in the liver lipids was high although the hydrocarbon was present in negligible amounts in the zooplankton.

In the present study, four samples of liver oil from basking shark and a composite liver lipid from pig were saponified, and the unsaponifiable portion was chromatographed over alumina, yielding hydrocarbons, alcohols, and sterols (5 fractions). Analysis was by temperature-programmed gas chromatography and silica-gel chromatography.
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 ABSTRACTER: F. T. Piskur

6.0 SPECIAL ANIMAL PROTEIN AND FATS REPORT

Feedstuffs 41, No. 11, 24 ff. (March 15, 1969)

The special report covers six articles on the protein and fats of animal byproducts:

Nutritional Constituents in Animal and Poultry Byproducts Meals. Doty, D. M., pp. 24, 26, 28, 30, 58. [10 tables, 7 references]

Use of Stabilized Animal Fat in Livestock Rations. Cardon, B. P., pp. 32, 34. [1 figure, 3 tables]

Role of Rendering Products in Meeting Nutrient Requirements of Poultry. Summers, John D., pp. 36-37. [7 tables]

Effect of the Nutritional Value of Poultry Byproduct Meal of Adding An Antioxidant During Processing. Kirkland, Wiley and Henry L. Fuller, pp. 38-40. [2 figures, 5 tables, 9 references]

Use of Meat and Bone Meal and Feather Meal for Ruminants. Barrick, E. R., pp. 41-42. [10 references]

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 ABSTRACTER: F. T. Piskur

4.15

The first four fractions showed hydrocarbons with squalene increasing to Fraction 3. The pristane level was highest in Fraction 1. Other hydrocarbons occurred at levels of 420-750 mg.percent in the oils on a weight basis; of these, about 60 percent constituted a series of n-paraffins. Unsaturated hydrocarbons, mainly, eluted after squalene. The oils contained up to 460 mg.percent sterol and 78-270 mg.percent alcohols of C_{10} to C_{30}. (The ratio of saturated:unsaturated members was 1.6).

Hydrocarbons constituted 450-700 mg.percent of the unsaponifiable mixture of the pig liver lipids; squalene, paraffins, and additional unsaturated components occurred at levels of 20.6, 24.4, and 11.9 mg.percent, respectively. The saturated hydrocarbons were high in normal homologs ranging in relative carbon number from 15 to 36; pristane was not detected. The pig liver lipids contained 10.6 percent sterol and 400 mg.percent alcohols; the latter consisted of 81.8 percent saturated members (C_{12} to C_{31}; ratio of saturated:unsaturated members about 4.4). [1 figure, 7 tables, 16 references]

6.0 (Cross Reference: 4.82)

Animal Byproducts as Sources of Amino Acids for Growing Swine. Meade, R. J., pp. 43-46. [5 tables, 10 references]

6.15 FEEDSTUFF MANUFACTURE

Canadian Patent 798,274
Senyi, M.
Food Technology 23, No. 3, 118 (March 1969)

Product is prepared by fermenting mixtures of molasses and fish stick water with yeast. [Abstracter: F. T. Piskur]

3.3342 (Cross Reference: 3.30)

The hydrogen sulfide content of the mud itself was not sufficient to cause spoilage of the canned clams--unless undetermined chemical or bacteriological factors are involved. [1 figure, 5 tables, 15 references]

3.3344 PROCESSING OF QUEEN CRAB

Anonymous
Fisheries of Canada 21, No. 8, 10-13 (February 1969)

In 1965, practically no Atlantic queen crab was landed in Canada. But in 1967, 1,500,000 lb. was landed; in 1968, 10,000,000 lb. was landed. Most of the crabs were caught in the Gulf of St. Lawrence and off the East Coast of Newfoundland. To process the catch, 20 new plants employing about 700 on-shore workers have been established. This article contains 11 photographs illustrating some of the specially designed equipment and some of the processing steps that are being used in the new plants. [Abstracter: L. Baldwin]

4.92 (Cross References: 4.11, 9.14)

(caused by degeneration of the fibers) and atrophy of the connective tissues of the myoseptum; those fed the methyl ester of the secondary products developed a marked hyaline degeneration of muscle fibers and a somewhat less pronounced atrophy.

Because the methyl esters of the fractionated fatty acids induced different types of muscular degeneration, the authors conclude that the toxic factors in oxidized saury oil have different pharmacological activities. But, since all three types of muscular degeneration occurred, they also conclude that the muscular dystrophy induced in the carp by the oxidized saury oil is caused by the combined action of different toxic factors and that these factors are not only produced by oxidation but are inherent in the fatty acid moiety. They postulate that the monomers obtained from fractions 2 and 3, like those obtained from soybean oil by Ota et al. in 1964, might have included some oxidized ones that caused muscular degeneration. [5 figures, 6 tables, 10 references]

6.190 THE STORAGE OF FISH MEAL AND ITS NUTRITIONAL VALUE

Dreosti, G. M.
Fishing News International 8, No. 1, 37 (January 1969)

During prolonged storage of fish meal, certain changes may take place that may affect the meal's nutritive quality. These changes are primarily associated with the oxidative reactivity of the oil in the fish meal and may show up as small losses of energy value, protein quality, and vitamin E. There is some confusion about the effect of storage on fish meal and the nutritional significance of rancid fats in fish meal. To clarify the situation, the author stated:

1. The unoxidized fractions of fish oils may taint the flesh of birds and farm animals that eat fish meal [when fed in excessive amounts], not the oxidized fraction. Therefore, there is less chance of taint with cured meal than with meal stabilized with antioxidant.

2. There is no danger of spontaneous combustion of fish meal properly treated with antioxidants.

3. Fish meal stabilized by curing has not been proved to have any factors toxic to birds and animals.

4. Fish meals having a low content of unreactive oil may not benefit sufficiently from antioxidant treatment to justify the cost involved. However, no harm can result from such meals treated with antioxidant.

 ABSTRACTER: F. T. Piskur

6.54 QUALITY AND NUTRITIVE VALUE OF PASTA MADE FROM RICE, CORN, SOYA, AND TAPIOCA ENRICHED WITH FISH PROTEIN CONCENTRATE

Kwee, Wie Han (Maryland Agricultural Experiment Station, Department of Horticulture, University of Maryland, College Park), Virginia D. Sidwell (Bureau of Commercial Fisheries Technological Laboratory, U.S. Fish and Wildlife Service, College Park, Maryland), Robert C. Wiley, and O. A. Hammerle
Cereal Chemistry 47, No. 1, 78-84 (January 1969)

The animal protein intake of Indonesians is about 5 grams per capita per day. Since pasta is a customary part of the Indonesian's normal diet, adding fish protein concentrate (FPC) to the flours from which it is made could be a means of remedying the protein inadequacy. This article describes the authors' search for a flour that when supplemented with FPC would yield a pasta both culturally acceptable and nutritionally efficient.

Flours made from rice, corn, soya, and tapioca (staples in the Indonesian diet) were supplemented with FPC prepared from red hake, small amounts of other flours (such as those made from peanuts, sesame, phaseolus, and sweet potato), and semolina (as a binding agent). The noodles made from these flours were evaluated in terms of their cooking characteristics and their appearance. The 14 samples scoring highest were then chosen for further study. (When appearances were essentially equal, the cost of production was the deciding factor.)

Three 14-member sensory panels composed of (1) employees of a U.S. fisheries laboratory, (2) staff and students from a U.S. university, and (3) employees of

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 ABSTRACTER: L. Baldwin

7.591 HISTIDINE METABOLISM IN FISH.
III - PURIFICATION AND SOME PROPERTIES
OF HISTIDINE DEAMINASE FROM MACKEREL MUSCLE

Sakaguchi, Morihiko, and Akira Kawai (Research Institute for Food Science, Kyoto University, Kyoto, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 34, No. 11, 1040-1046 (November 1968)

A procedure for partially purifying histidine deaminase extracted from the muscle of mackerel (Scomber japonicus) was developed, and some of the properties of the enzyme were examined. Using a seven-step procedure, the authors were able to purify the enzyme about 380-fold. Fresh muscle (completely free of blood) homogenized with threefold volumes of 1 percent KCl and centrifuged at 10,000 g. for 20 min. yielded the supernatant that served as the starting material.

The optimum pH for enzyme activity was 9.0. At pH 8.0, the enzyme was relatively stable at temperatures below 55° C.; above 55°, it was very unstable. At 37° C., it was stable between pH 6.2 and 10.0; below pH 6.2, it was significantly unstable. Zinc and the metal chelator ethylenediaminetetraacetate did not affect the activity of the enzyme. Cadmium and p-chloromercuribenzoate inhibited the activity drastically; however, addition of cysteine to the latter compound negated the inhibitory effect. SH compounds had a very slight inhibitory effect.

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 ABSTRACTER: L. Baldwin

7.591 PROPERTIES OF β-GLUCURONIDASE OF RAINBOW TROUT, SKIPJACK, AND ABALONE

Nagayama, Fumio (Tokyo University of Fisheries, Konan 4, Minato-ku, Tokyo), and Masaro Hayashi (Mochida Pharmaceutical Co., Ltd., Research Laboratory, Kamiya 1 Kita-ku, Tokyo, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 34, No. 11, 1047-1057 (November 1968) (In Japanese; summary, figures, and tables in English)

The properties of β-glucuronidase from bovine liver were compared with those from the livers of rainbow trout and skipjack and the viscera of abalone. The optimum pH for maximum enzyme activity at 37° C. was 3.6 for the abalone enzyme, 4.5 for the trout and skipjack enzymes, and 5.0 for the bovine enzyme.

The activity of trout enzyme was inhibited competitively by glucaro-1,4-lactone and noncompetitively by metal ions; inhibition by metal ions was almost completely negated by the addition of cysteine to the enzyme-metal ion solution. The activity of the trout enzyme was also inhibited by heparin and deoxyribonucleic acid.

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 ABSTRACTER: L. Baldwin

6.54

an Indonesian embassy evaluated the chosen samples for organoleptic acceptability. The Indonesians liked the tannish noodles better than the pale ones. They objected less to the grittiness imparted by the FPC than the Americans did. Noodles with rice as the basic ingredient were the most acceptable; those containing 10 percent sweet potato flour were liked even better than the standard (60 percent semolina, 30 percent all-purpose flour, 10 percent FPC). Pastas containing about 50 percent tapioca flour, though softer than the rice ones, had a more attractive color; moreoever, the tapioca seemed to smooth out some of the grittiness. Of the incidental flours added in small amounts, only sweet potato flour proved beneficial; it improved appearance, texture, and flavor.

Proximate analyses revealed that the pastas containing either 10 percent or 20 percent FPC had a higher protein content than commercial pastas have; rice pasta containing 10 percent FPC had over twice the protein content of plain rice, The protein concentration of cooked pasta was slightly higher than that of the raw product, possibly owing to the drying process or to leaching during cooking.

Cooking analyses showed that the water absorbed varied from 240 to 500 percent, which is within the range of water absorbed by commercial pastas. Except for samples containing sweet potato, cooking losses were similar to those in commercial macaroni products (Holliger, 1963). The percent of protein in the cooking losses of all the samples was very low.

To test the nutritional efficiency of the various formulations, the authors fed raw and cooked noodles ad libitum to male albino weanling rats for 1 month. On the basis of weight gained from food consumed, the samples containing both 10 percent and 20 percent FPC were as nutritious in protein quality as casein is.

7.591 (Cross References: 0.38, 8.59)

Michaelis constants of phenolphthalein-ß-D-glucosiduronic acid and p-nitrophenyl-ß-D-glucosiduronic acid for the enzymes at optimum pH were, respectively: trout, 1.43×10^{-4} and 3.33×10^{-4}; skipjack, 1.43×10^{-4} and 1.25×10^{-4}; abalone, 2.10×10^{-4} and 1.11×10^{-4}; and bovine, 2.86×10^{-4} and 2.50×10^{-4}. Arrhenius plots of each enzyme at optimum pH showed a downward bend at 31° for trout, 36° for skipjack, 40° for abalone, and 37.5° for bovine. Activation energy (in cal./mole) below the transition temperature was 18,400 for trout enzyme; 19,300 for skipjack enzyme; 18,500 for abalone enzyme; and 20,200 for bovine enzyme. Above the transition temperature, the values were 4,350; 2,740; 11,500; and 8,200 cal./mole, respectively. The body temperature of the animal from which the enzymes were prepared seemed to have no effect on the thermostability of the enzyme. [11 figures, 9 tables, 23 references]

6.54 FAT EXTRACTION PROCESS

British Patent 1,127,329
Levin, E.
Food Technology 23, No. 3, 39 (March 1969)

Fish (or meat or coconut) material treated with ethylene dichloride and heated yields a defatted, dehydrated product. [Abstracter: F. T. Piskur]

7.591 (Cross References: 0.38, 8.59)

These results indicate that histidine deaminase of muscle is different from that of liver or Pseudomonas fluorescens.

7.594 (Cross Reference: 7.77)

ZUR ERMITTLUNG DES PFLANZENÖLZUSATZES BEI FISCHKONSERVEN IN ÖL, INSBESONDERE BEI SARDINEN IN ÖL
[DETERMINING VEGETABLE-OIL ADMIXTURES IN OIL-PRESERVED FISH, ESPECIALLY IN OIL-PRESERVED SARDINES]

Wurziger, J., and G. Hensel (Aus der Chemischen und Lebensmitteluntersuchungsstalt im Hygienischen Institut der Freien und Hansestadt Hamburg, West Germany) Fette-Seifen Anstrichmittel 70, No. 12, 973-978 (December 1968) (In German; summary in English)

This address was delivered to the Congress of the German Society for Fat-Science in Muenster, Westphalia, on October 9, 1968. It shows, with examples, that olive oil in the oil of sardines can be approximately determined on the basis of sterols (starting from the digitonides). Because of the great difference between the development of color by cholesterol and sitosterol during the Liebermann-Burchard reaction, the amounts of animal and vegetable sterols can be determined. Once the average sterol content is arrived at, the possible amount of olive oil can be deduced. [10 tables, 7 references]

[Abstracter: L. Baldwin]

7.51 (Cross Reference: 7.591)

METHOD FOR SIMULTANEOUS ISOLATION OF MYOGLOBIN, CYTOCHROME C AND HEMOGLOBIN FROM TISSUE

Nakagawa, Jun, and Paul C. Hudgins (Research Laboratory, St. Vincent's Hospital, Jacksonville, Florida 32203)
Analytical Biochemistry 26, No. 3, 358-363 (December 1968)

The paper describes a method for the simultaneous isolation and purification of myoglobin, hemoglobin, and cytochrome c from muscle tissue. The primary advantages of the method are (1) the economy of tissue used in the recovery of the chromoproteins makes the size or rarity of the experimental animal unimportant, and (2) the data obtained are truly comparative because the pigments are isolated from the same cellular population. [1 figure, 1 table, 7 references]

[Abstracter: F. T. Piskur]

7.80 A NEW APPROACH FOR EVALUATING THE QUALITY OF FISHERY PRODUCTS

Learson, Robert J., and Louis J. Ronsivalli (Bureau of Commercial Fisheries Technological Laboratory, U.S. Fish and Wildlife Service, Gloucester, Massachusetts 01930)
Fishery Industrial Research 4, No. 7, 249-259 (March 1969)

Although organoleptic panels lack precision, they are the only instrument that, at present, can integrate all the factors that affect quality. Described here is a new approach to improving panel precision. Using the approach, a panel expresses quality in terms of the estimated storage time of the sample rather than in such ambiguous terms as "excellent," "very good," and "borderline." The approach obviates the need for arbitrary terms to describe quality and assists the panelist in making his evaluations objectively. Statistical analysis of the results obtained when a panel used the method on samples of fresh cod fillets indicates that the storage age of such samples can be estimated to within ±2.2 days with a reliability of 95 percent.

Advantages of the system are:

1. It is simple--panelists are easily and quickly trained.

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 ABSTRACTER: F. T. Piskur

7.81 GAS CHROMATOGRAPHIC ANALYSIS OF HEAD-SPACE VAPORS TO IDENTIFY MICRO-ORGANISMS IN FOODS

Guarino, Philip A. (McCormick and Company, Baltimore, Maryland), and Amihud Kramer (Department of Horticulture, University of Maryland, College Park 20704)
Journal of Food Science 34, No. 1, 31-37 (January-February 1969)

Recent studies have indicated that gas chromatographic analyses of compounds arising from normal metabolic processes of microorganisms may be useful in identifying the organisms. The purpose of the present study was to examine the use of gas chromatographic analyses of headspace vapors as a quality control procedure for the rapid identification of certain bacteria of sanitary and public health significance in foods.

Representative organisms of the following genera were used: Escherichia, Salmonella, Citrobacter, Enterobacter, Proteus, Alkaligenes and Pseudomonas. The headspace vapors over synthetic broth cultures were analyzed to obtain reproducible patterns differentiating the bacteria. Selected food materials (milk, dried peas, and ground hamburger) were inoculated with two cultures (Salmonella and Enterobacter), stored at 5° C., then examined by the gas chromatographic procedure.

Gas-liquid partitioning of headspace vapors over dextrose fermenting bacterial cultures produced chromatographic patterns differentiating members of the family Enterobacteriaceae. Analysis of two food materials inoculated with test

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 ABSTRACTER: F. T. Piskur

7.89 RELATION BETWEEN THE QUALITY OF CANNED FISH AND ITS CONTENT OF ATP-BREAKDOWNS. I - ATP-BREAKDOWNS IN CANNED PINK SALMON AND MACKEREL IN RELATION TO THEIR INSPECTION GRADES

Fujii, Yutaka, and Eizaburo Noguchi (Tokai Reg. Fish. Res. Lab., Chuo-ku, Tokyo, Japan), and Kuo-Hsiung Su (Lab. Food Technol. Fac. Agri. Tokyo Univ. Education, Meguro-ku, Tokyo, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 34, No. 11, 1031-1035 (November 1968) (In Japanese; summary and figures in English)

In canned fish, the compounds resulting from decomposition of ATP (adenosine triphosphate) clearly reflect the degree of freshness of the raw fish that was canned. In this paper, the authors correlate these compounds with the odor of various officially specified grades of canned pink salmon (Oncorhynchus gorbuscha) and canned mackerel (Scomber japonicus).

Hypoxanthine (Hx), inosin (HxR), and inosine monophosphate (IMP) were analyzed using 5'-nucleotidase (or alkali phosphatase) plus nucleoside phosphorylase and xanthine oxidase. The ratio of Hx (moles/g.) to Hx + HxR + IMP (moles/g.) corresponded to the grade of the canned salmon--the larger the ratio, the less favorable the odor. The ratio of IMP to Hx + HxR + IMP corresponded to the grade of canned mackerel better than did the ratio with Hx as the numerator.

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 ABSTRACTER: L. Baldwin

8.51 ABSENCE OF LIPID RESIDUES IN PURIFIED MYOSIN

Olcott, H. S., E. G. Richards, J. Van der Veen, and B. F. Medwadowski (Department of Nutritional Sciences, Institute of Marine Resources, University of California, Berkeley 94720)
Bulletin of the Japanese Society of Scientific Fisheries 34, No. 12, 1112-1113 (December 1968) (In English)

In 1967, Ikeda and Taguchi reported that they had observed 0.093 mg. lecithin per milligram of protein nitrogen in purified actomyosin prepared from the muscle of yellowtail (Seriola quinqueradiata). Because solutions of actomyosin are highly viscous, the actomyosin itself is extremely hard to purify. However, relatively pure myosin, which is more complicated than the actin, can be readily obtained, so the authors examined this component of the protein complex for residual lipids. They used the myosin from fresh rabbit muscle, since fish myosin closely resembles that of rabbit, analyzing it by the methods of Medwadowski et al. (1967) for identification of trace lipids in proteinaceous tissues.

The homogenized rabbit myosin was extracted with organic solvents, then hydrolyzed, and the hydrolyzate was extracted. Although traces of lipidlike material appeared in the extracts, thin-layer chromatography revealed no identifiable lecithin in the traces. Rather, the patterns resembled those on chromatographs of the residues when large amounts of the redistilled solvents were evaporated.

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 ABSTRACTER: L. Baldwin

7.9 (Cross Reference: 0.112)

COLOR MEASUREMENT OF FOODS: IX - TRANSMISSION-REFLECTION SPECTROPHOTOMETRY AND TRISTIMULUS COLORIMETRY

Clydesdale, F. M., and F. J. Francis (Department of Food Science and Technology, University of Massachusetts, Amherst)
Food Product Development 3, No. 1, 62-63, 65, 67, 70, 72, 114 (February-March 1969)

Color involves three components: a source of light, an illuminated object, and an observer. The CIE (Commission Internationale de l'Eclairage) system, described in earlier papers, provides a standard observer response and a specification of a standard source in terms of CIE Standard sources simulating incandescent light, noon sunlight, and overcast daylight. The third factor is the illuminated object--the test color to be measured. The present paper discusses the theory of measurement of color by use of transmission-reflection spectrophotometry and tristimulus colorimetry. [5 figures, 2 tables, 7 references]

[Abstracter: F. T. Piskur]

7.80

2. It is objective and unambiguous--judgements are based on standard quality characteristics objectively determinable for control samples.

3. It is comprehensive and direct--panelists compare the quality of the sample with the entire spectrum of quality for the particular species.

4. Each panelist develops his own tools (scale and scoresheet) for measurement of standard quality characteristics based upon his own experience.

[3 figures, 3 tables, 4 references]

7.89 (Cross Reference: 3.30)

From these findings, the authors propose that the data derived from analyses of ATP compounds be used as an index of quality for canned fish.

[6 figures, 10 references]

7.45 (Cross Reference: 6.197)

STUDIES ON THE CHICK ASSAY FOR PHOSPHORUS

Motzok, I. (Department of Nutrition, University of Guelph, Guelph, Ontario, Canada)
Feedstuffs 41, No. 10, 46-47 (March 8, 1969)

Recent studies show that a practical diet supplemented with an appropriate amount of readily available calcium may be used successfully as the basal diet for the chick bioassay of phosphorus. The precision of the assay is better when the percent ash of the tibia is the response criterion rather than the weight of the ash of the tibia. [5 figures, 3 tables, 15 references]

[Abstracter: F. T. Piskur]

7.81 (Cross Reference: 7.1)

organisms showed the presence of Salmonella and Enterobacter. Gas chromatographic analysis of the third food material (which had been contaminated with a mixed flora) indicated the presence of members of the family Enterobacteriaceae.

The authors conclude that gas chromatographic analysis of headspace vapors is a reproducible method that can be applied as a screening procedure to detect Enterobacteriaceae in foods. [4 figures, 2 tables, 16 references]

8.51

The authors conclude that in all likelihood purified myosin contains no significant amounts of any type of lipid. They recognize that, although presumably neither purified fish myosin nor purified fish actin contains lipid, the actomyosin may by remote chance be a lipoprotein. However, the most probable explanation for the observations of Ikeda and Taguchi, the authors conclude, is that the actomyosin used was not completely free of extraneous lipids. [4 references]

8.51 HAEMATOLOGICAL STUDY OF A SPECIES OF ROCKFISH, SEBASTISCUS MARMORATUS--III - CHANGE OF SERUM PROTEIN FRACTIONS DURING STORAGE

Yamashita, Hideo (Seikai Regional Fisheries Research Laboratory, Nagasaki, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 34, No. 12, 1059-1065 (December 1968) (In Japanese; summary, figures, and tables in English)

Using the same techniques he used in earlier studies (1967), the author sampled the blood, determining the percentage of plasma and measuring the amount of serum protein and the level of urea nitrogen in the serum of male and female rockfish, Sebastiscus marmoratus. He also electrophoretically analyzed the amount of change that occurred in the serum protein and its fractions during storage and compared the electrophoretic patterns produced by the fish serum with those produced by human serum.

The amount of serum protein seemed to increase with the length of storage at 4°-7° C. The fresh serum of both sexes gave five clear peaks; differentiation of the peaks lessened as storage increased. Electrophoretic patterns were reproducible for only the first 3 days of storage. The position of each component, especially of the first peak, tended to move toward the anode. None of the patterns given by the components of either male or female fish serum protein equaled in migration that of the albumin of normal human serum. The maximum peak
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 ABSTRACTER: L. Baldwin

9.12 POSITIVELY REINFORCED BEHAVIOUR AND THE FOREBRAIN IN GOLDFISH

Savage, G. E., and I. R. Swingland (Department of Zoology, Queen Mary College, University of London, London, England)
Nature 221, No. 5183, 878-879 (March 1, 1969)

Unpublished evidence suggests that fear responses, as indicated by respiratory deceleration in red light, are identical in normal and forebrainless fish. Thus the decrease in the performance of animals without forebrains is apparently not peculiar to fear-motivated situations. In 1968, Aronson showed that operant behavior in Tilapia macrocephala rewarded with food is impaired by removal of the forebrain and that ability to discriminate shapes is much poorer in forebrainless than in normal fish subjected to the food stimulus. These findings do not conform with those of Janzen (1933) and of Nolte (1933), who found little difference in the ability of normal and forebrainless fish to discriminate shapes and colors.

To find out whether there is an operant deficit in goldfish (Carassius auratus) comparable to that in T. macrocephala and, if so, to learn what part this deficit plays in the discrimination process, the present authors conducted a series of experiments. Normal and forebrainless fish were tested for their ability to learn how to operate a light-actuated feeder, their rate of reaction to food presented in a holder, their ability to associate the shape of a rectangle with
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 ABSTRACTER: L. Baldwin

8.51 HAEMATOLOGICAL STUDY OF A SPECIES OF ROCKFISH, SEBASTISCUS MARMORATUS--IV - CHANGE OF THE AMOUNT OF BLOOD ELEMENTS AND THE ELECTROPHORETIC PATTERN OF SERUM PROTEIN UNDER THE INFLUENCE OF STRESS

Yamashita, Hideo (Seikai Regional Fisheries Research Laboratory, Nagasaki, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 34, No. 12, 1066-1071 (December 1968) (In Japanese; figures, tables, and summary in English)

In the analyses of blood samples, fish that have just been caught are commonly used. However, since fright and stress may affect the blood elements, the author examined these influences to learn what technical errors they might introduce into results as normally obtained. He determined the specific gravity of the blood, the percentage of plasma, the amount of total serum protein, and the level of urea nitrogen in the serum of male and female rockfish (Sebastiscus marmoratus) that had been exercised for different periods of time or that had been allowed to rest before blood samples were taken.

None of the values for the male fish differed from those of the female fish. The amount of total serum protein was larger for exercised fish than for resting
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 ABSTRACTER: L. Baldwin

9.16 COMPLETE OYSTER FARM CONTROLS DIFFICULT BECAUSE OF FEEDING

Adler, Cyrus, and George Claus (Offshore/Sea Development Corp.)
Quick Frozen Foods 31, No. 7, 149-150 (February 1969)

The changes that occur in the oyster's environment as a result of estuarine pollution makes the old, well-established methods of oystering futile. Yet complete environmental control is difficult because of the highly selective feeding habits of the bivalve. Scientists are not really sure about what it feeds on naturally, and laboratory experiments have shown that, although it can use several simple unicellular flagellates as food, the numbers of such organisms in estuaries is so small that they can hardly serve as the oyster's major food source. To solve the problem, investigators are analyzing the availability of microorganisms occurring around oyster beds, and they are examining the value of pure cultures of individual microbes that have been isolated from the sea and fed to oysters in the laboratory.

Algae are also used as oyster feed. But present methods of culturing algae for this purpose are cumbersome and expensive. This fact, coupled with the lack of knowledge about feeding habits, with the fact that algae are not always efficient energy sources, and with the fact that a given artificial food is not necessarily utilizable by both larvae and adult oysters, creates a pyramid of problems.
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 ABSTRACTER: L. Baldwin

8.51 (Cross Reference: 9.13)

fish. The urea nitrogen in the serum of resting fish was less than 10 mg./100 ml.; in the exercised fish, it was more than 15 mg./100 ml. The electrophoretic pattern of serum protein in both resting and exercised fish showed five peaks; component IV was larger for the male than for the female, whereas component V was much larger for the female than for the male. The percentage of the serum protein fractions in the exercised fish was similar to that in the resting fish.
[2 figures, 5 tables, 11 references]

[Abstracter: F. T. Piskur]

ingest DDT-contaminated prey. [7 figures, 20 references]

9.13 (Cross Reference: 9.19)

IN VITRO DEGRADATION OF DDT BY INTESTINAL CONTENTS OF ATLANTIC SALMON (SALMO SALAR)

Cherrington, A. D., U. Faim, and O. T. Page (Department of Biology, University of New Brunswick, Fredericton, New Brunswick)
Journal of the Fisheries Research Board of Canada 26, No. 1, 47-54 (January 1969)

The fresh contents of the mid- and hind-gut of young, hatchery-reared Atlantic salmon degraded p,p'-DDT (1,1,1-trichloro-2,2-bis(p-chlorophenyl)-ethane) to p,p'-TDE (1,1-dichloro-2,2-bis(p-chlorophenyl)-ethane) in vitro. Most of the ability to degrade DDT was attributable to intestinal microorganisms. This ability to degrade DDT was eliminated by use of streptomycin and by heat-sterilization of the gut contents. Insomuch as TDE is less toxic than DDT, the activity of intestinal microorganisms may increase the chances of survival of fish that

8.51 (Cross Reference: 3.2495)

for the male appeared at the position of human α 2 globulin; that of the female at human β globulin. Component IV was the largest for both sexes.
[2 figures, 4 tables, 14 references]

9.15 (Cross Reference: 0.5)

ANTIBIOTIC ADDITIVES FOR THE ISOLATION OF CHONDROCOCCUS COLUMNARIS FROM FISH

Fijan, N. N. (Veterinary Faculty, University of Zagreb, Zagreb, Yugoslavia)
Applied Microbiology 17, No. 2, 333-334 (February 1969)

The author examined the use of neomycin and polymyxin B as additives to Cytophaga agar for isolation of Chondrococcus columnaris from diseased fish. Each of the antibiotic additives increased the number of discrete colonies of C. columnaris and suppressed growth of other bacteria, but when both were added to the medium, the results were better and more consistent. [2 tables, 2 references]

[Abstracter: F. T. Piskur]

9.125 ESTUDIO ANATOMICO DEL PEZ CARIBE
[ANATOMICAL STUDY OF THE PIRANHA]

Martinez L., Liborio (Escuela de Educación, Facultad de Humanidades y Educación, University of Zulia, Maracaibo, Venezuela)
Boletin del Centro de Investigaciones Biológicas, Universidad del Zulia, Maracaibo, Venezuela, Apdo. No. 415) (In Spanish)

This bulletin contains a complete physical description of the piranha, including its skeletal structure; dimensional details; and nervous, excretory, genital, circulatory, muscular, and digestive systems.
[1 table, 5 photographs, 12 references, and about 60 line drawings]

[Abstracter: L. Baldwin]

9.16 (Cross Reference: 1.81)

Just solving the feeding problems will not bring a final solution to raising oyster production from its present low level, for mortality is very high--about 95 percent of the larvae die during the first week, and more than 50 percent of the survivors die before they have set. The ultimate solution seems to be to grow oysters in large tanks or basins in which the temperature, salinity, and pH of the water are maintained at constantly optimum levels. If the water is adequately filtered to remove the eggs of parasites and potentially harmful microbes, the oysters can be raised much faster and at much smaller risk than present techniques permit.

The authors suggest that the production and the consumption of oysters will increase appreciably within the next decade. Hopefully oysters will be grown as chickens and ducks are grown now. Such a development in culturing techniques will pay off not only by supplying the demands of a luxury market but by drastically reducing the price so that oysters will no longer be simply a luxury item.

Yet even though oysters are routinely grown to marketable size in 12 months, gourmets may still prefer those that were grown at a slower rate. Investigations have shown that the taste of oysters raised under natural conditions differs somewhat from that of those grown artificially. Apparently the oyster's semihibernation during the winter months is a requisite of the flavor gourmets appreciate. Thus at least a small part of future harvests will probably be grown under today's conditions and with today's techniques. [1 graph]

9.12

the preferred accompanying bait, and the effect of several seconds' delay between their response and their reward.

The results showed that the fish's memory is not affected by removal of the forebrain. If their response is rewarded instantaneously, the forebrainless fish's reaction is unimpaired; but if the reward is delayed or is separated from the stimulus, they cannot hold the stimulus trace long enough for the reward to be effective. The authors conclude that the fish's forebrain acquires and maintains associations involving food as reinforcers similar to those involving pain.
[3 figures, 6 references]

9.19 REPORT CITES THERMAL POLLUTION DANGERS

Anonymous
Chemical and Engineering News 47, No. 8, 50-51 (February 24, 1969)

By 1985, the author predicts, one-fourth the nation's surface water will be passing through the heat exchangers of the electric power industry. By 2000, the amount of generated power could be quadruple today's. Despite the menace of such growing heat pollution, Government standards for water quality have not been definitively set and approved, chiefly because of the lack of data necessary for establishment of temperature criteria.

The technical baselines for control of thermal pollution are, however, being developed. The Federal Water Pollution Control Administration (FWPCA) is sponsoring projects and holding conferences at universities throughout the country in furtherance of a solution to the problem. In addition, hydraulic, sanitary, and chemical engineers are bringing to bear the principles of their diverse disciplines in a concerted search for answers. Several of the tangible results of this search are mentioned in the article.

A report by Dr. Joseph A. Mihursky et al. on the Patuxent River estuary shows how heat can alter water around a power plant and degrade the nearby biosphere. Dr. Mihursky, who is Chairman of the Department of Environmental Research at Maryland's Chesapeake Bay Laboratory, Solomons, Md. 20688, sums up the findings by noting that biological effects of the plant's cooling water are due

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 ABSTRACTER: L. Baldwin

9.6 OUR NATION AND THE SEA:
A PLAN FOR NATIONAL ACTION

Report of the Commission on Marine Science, Engineering and Resources, 305 pp. (January 1969)
Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Price $2.75

Public Law 89-454, the "Marine Resources and Engineering Development Act of 1966," directed the President to establish a Commission on Marine Science, Engineering, and Resources. The Commission was to have 15 members drawn from Federal and State governments (no more than five from the Federal Government), industry, universities, and laboratories and other institutions engaged in marine scientific or technological activities, plus four advisory members from Congress.

The Commission was charged with making a comprehensive investigation of all aspects of marine science so it could recommend an overall plan for an adequate national oceanographic program to meet present and future national needs. Specifically, it was to (1) review the known and contemplated needs for natural resources from the marine environment; (2) review the surveys, applied research programs, and ocean engineering projects required to obtain the needed resources from the marine environment; (3) review existing national research programs to insure realistic and adequate support for basic oceanographic research; (4) review existing oceanographic and ocean engineering programs, including education and technical training, to determine which programs are required to advance our

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 ABSTRACTER: L. Baldwin

9.2 SYMPOSIUM: MARKETING AND PRODUCT DEVELOPMENT

Cantor, Sidney M., et al.
Food Technology 23, No. 3, 16 ff. (March 1969)

1. Introduction.--Sidney M. Cantor, p. 16. In this symposium, marketing was considered an integrative process--an emerging discipline that involves identifying a need of the consumer and using all facilities of the institution(s) to satisfy that need.

2. Product Development from a Marketing Viewpoint.--Harold S. Ricker, pp. 16-18. Marketing deals not only with the selling of goods and services but also with planning, research, product development, purchasing, distribution, the behavioral sciences, and various allied services and activities. Each functional area of a company must be "consumer oriented." The resources of a company must be coordinated and integrated to serve the needs of consumer at profit to both.

3. The Advertising Agency and Product Development.--Paul A. Lawless and A. K. Katzenstein, pp. 20-21. Advertising agencies now provide services in marketing research, public relations, merchandising, and activities related to the arts of communications and merchandising.

4. Marketing Decision Making.--Rex M. Budd, pp. 21-24. The skills of members of each functional area--research, production, sales, advertising--must be

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 ABSTRACTER: F. T. Piskur

9.6 UNDERWATER SCIENCE AND TECHNOLOGY

Anonymous
ILIFFE-NTP Incorporated, 300 East 42nd Street, New York, N.Y. 10017

The requirement for a comprehensive reference source of scientific and technological information on applied underwater research grows as pertinent articles, papers, and reports proliferate. To meet this requirement, two new publications are being launched.

1. Underwater Science and Technology Information Bulletin, a monthly list of references and patent abstracts. The list of references covers all published articles, papers, and reports that have technological significance in the areas of marine biology; biological resources; nonbiological resources; geology and geophysics; hydrography and topography; meterology and hydrology; oceanography; diving; engineering and structures; transportation, surface vessels, submersibles, and vehicle subsystems; instrumentation and equipment; navigation and communications; pollution; policy, administration, and legislation. The patent abstracts provide details of all recently published patents that have been taken out by worldwide organizations and that relate directly to, or have an important bearing on, underwater science and technology.

The Bulletin also includes information about new books and about forthcoming conferences, symposia, meetings, and exhibitions; in addition, it contains

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 ABSTRACTER: L. Baldwin

9.2

brought to bear so that the right decisions can be made in the evaluation and marketing of new products.

5. From Laboratory to Consumer in One Easy (?) Step.--S. Allen Heininger, pp. 24-26. There may be no one "best" way of organizing a company to achieve effective coordination of new product programs. The optimum way will be dictated by the nature of the markets to be served, the types of products involved, and personnel and other resources available. One case study is described.

9.3 LEGAL RAMIFICATIONS OF PORTION CONTROL PACKAGES AND THEIR DISTRIBUTION

Lambert, Eugene I. (Covington and Burling, Washington, D.C.)
Food Product Development 3, No. 1, 26-27, 30 (February-March 1969)

The paper discusses the labeling of portion-controlled food packages moving in interstate commerce. [Abstracter: F. T. Piskur]

9.6

commentaries, topical worldwide news, and references to general reviews and miscellaneous articles. Every 6 months, an appendix will be published containing a cumulative index of keywords in the references and in the patent abstracts, of authors, and of underwater terminology; and a master list of publications being searched for the references section. A 1-year subscription to the Bulletin is $35.

2. Underwater Science and Technology Journal, a quarterly publication providing for the exchange of original ideas and current information on applied research, development, and practice in the underwater environment. It serves people in the following disciplines: physical and chemical oceanography, marine and fresh-water biology, hydrology, hydrography, marine geology and geophysics, meteorology, mineralogy, and physiology. Since it is intended to complement the Bulletin, it will cover in depth many of the matters cited in that publication. A 1-year subscription to the Journal is $20.

A 1-year joint subscription to the Bulletin and the Journal is $50.

9.19

not only to temperature, heavy metals, and chlorine, but to largely unknown mechanical changes that occur when microorganisms are sucked into plant water.

Realizing that chemical engineering principles hold the answer to a host of problems in thermal pollution control, Dr. Leigh Short, a chemical engineer at the University of Massachusetts (Amherst, Mass.) uses a three-dimensional mathematical model of a stream in his thermal pollution studies. Handling the problem in this way is the approach advocated at a mid-February conference on thermal pollution held at the University of Virginia. Such models can help power plant engineers both design the plant and select the site.

At the conference, such biological and technological aspects of thermal pollution control were covered as heat loads, chemical and physical effects, cooling devices, process changes, general ecological effects, and transport and behavior manipulation of discharge. A key manual that was distributed to the conferees, "Industrial Waste Guide on Thermal Pollution," is available from FWPCA, U.S. Department of the Interior, Washington, D.C. 20240.

Of especial interest to chemical engineers was a paper on research needs delivered by Frank H. Rainwater, Chief of the National Thermal Pollution Research Staff, FWPCA Northwest Water Laboratory, Corvallis, Oregon 97330. Besides describing the many considerations governing development of a successful three-dimensional aquatic model (for example, convection, wind, evaporation, and long-wave atmospheric radiation), the paper called for new ideas on cooling methods.

Other meeting topics included suggestions for the conservation and use of waste heat. One suggestion was use of the heat to propagate commercial fish and shellfish in environmentally controlled pools for large-scale fish farming.

9.6

national oceanographic competence and stature and which are not adequately supported; (5) analyze the findings of the above reviews, including the economic factors involved, and recommend an adequate national marine science program that will meet present and future national needs; and (6) recommend a government organizational plan to support the program and estimate its cost.

The Act directs the Commission to make a final report of its findings and recommendations within 18 months of its establishment. The major chapters of that report are as follows: 1. An Introduction and Summary; 2. National Capability in the Sea; 3. Management of the Coastal Zone; 4. Marine Resources; 5. The Global Environment; 6. Technical and Operating Services; 7. Organizing a National Ocean Effort; and 8. A Financial Plan for Marine Science.

The report is liberally illustrated with photographs, tables, maps, and graphs. Appendix 2 is a table of the recommendations made throughout the body of the report. Appendix 4 is a bibliography of the reports made by the seven panels into which the Commission divided itself for operating purposes, reports of supplementary contract studies, and staff papers; the gist, price, and dissemination channel of each are noted. The report is indexed.

0.4 (Cross Reference: 3.336)

MONOSODIUM L-GLUTAMATE: ITS PHARMACOLOGY AND ROLE IN THE CHINESE RESTAURANT SYNDROME

Schaumburg, Herbert H., Robert Byck, Robert Gerstl, and Jan H. Mashman (Albert Einstein College of Medicine, Bronx, New York 10461)
Science 163, No. 3869, 826-828 (February 21, 1969)

Monosodium L-glutamate (MSG), though placed by the Food and Drug Administration in the category termed "generally regarded as safe," is not a wholly innocuous food additive. It can cause headache; a sensation of tightness and pressure over the facial region; chest pain; and burning sensations over the chest, neck, shoulders, forearms, and abdomen and, occasionally, the thighs. The intensity of the MSG response is directly related to the size of the oral dose, though the oral threshold of different individuals is apparently unrelated to the weight, sex, or age of the consumer. Symptoms appear only if food containing MSG is eaten on an empty stomach by a susceptible individual. Since soups, which are usually eaten first, contain large amounts of MSG, they are the most culpable in evoking the "Chinese restaurant syndrome." [3 figures, 11 references]

[Abstracter: L. Baldwin]

0.7 (Cross Reference: 6.197)

SELENIUM--A MISSING LINK IN ANIMAL NUTRITION

Patrias, George (Hubbard Milling Co., Mankato, Minnesota)
Feedstuffs 41, No. 10, 24 (March 8, 1969)

Previous research indicates that selenium is required by livestock for growth and survival and as an aid in the cure and prevention of certain physiological disorders. Selenium requirements for poultry and farm animals are reported as 0.1 p.p.m. of ration for cattle, sheep, and swine; 0.15 p.p.m. for poultry [chickens]; and 0.2 p.p.m. for turkeys. However, selenium is toxic at higher levels--from 7.0 to 15 p.p.m. of the diet, depending upon the farm animal. The paper lists the range in the content of selenium for feed ingredients as follows (in p.p.m.): Alfalfa meal--<0.08-0.5, barley--<0.08-0.15, bentonite--<1-20, brewers grains--0.15-1.0, brewers dried yeast--0.06, corn--0.02-0.5, dicalcium phosphate--0.15-0.5, fish meal--1.0-5.0, gluten feed--0.15-0.5, gluten meal--0.1-1.5, linseed meal--1.1-1.2, meat meal--<0.08-0.5, oats--<0.08-0.5, poultry by-product--0.5-1.0, soybean meal--0.08-0.5, wheat--0.1-5.0, wheat middlings--0.15-1.0, and wheat bran--0.5-1.0.

[Abstracter: F. T. Piskur]

1.0112 (Cross Reference: 1.34)

ALASKA'S FISHERY RESOURCES--THE PINK SALMON

Bailey, Jack E. (Bureau of Commercial Fisheries Biological Laboratory, U.S. Fish and Wildlife Service, P.O. Box 155, Auke Bay, Alaska 99821)
U.S. Fish and Wildlife Service, Fishery Leaflet 619, iv + 8 pp. (March 1969)

Pink salmon, Oncorhynchus gorbuscha, also called humpback salmon, are the most abundant of the Pacific salmon in Alaska. Alaska production of pink salmon has an average wholesale value of $28 million and constitutes more than half of the total North American catch. Female pink salmon carry about 2,000 eggs each and spawn in late summer or early fall. The resulting fry emerge the following spring and migrate directly to salt water. They spend 1 year at sea and return as 2-year-olds to spawn and die in their native stream. Alaskan pink salmon usually spawn only a short distance from the sea; many even spawn in intertidal streambeds. Fewer than 25 percent of the young survive from the time of spawning until the time of emergence from the gravel. Similar low survival rates prevail during the estuarine and oceanic portions of the life cycle. Pink salmon are just over 1 inch long when they enter the sea, but they grow to an average length of about 20 inches and weigh about 4 pounds as adults. Research biologists of several agencies assist fishery managers by determining the migration paths and the factors that affect abundance of pink salmon. [5 figures, 2 tables, 12 references]

[Author's abstract]

2.1124 EFFECTS OF THE TYPE AND DEPTH OF A TRAP NET ON THE CATCH

Takeuchi, Shoichi (Tokyo University of Fisheries, Konan-4, Minato-ku, Tokyo, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 34, No. 11, 969-972 (November 1968) (In Japanese; summary, figures, and tables in English)

The author obtained information about the catch of yellowtail (Seriola quinqueradiata) and red sea bream (Chrysophrys major) in 1958, 1960, and 1961 from the logs of fishermen who had used ordinary trap nets or midwater trap nets in both inshore and offshore waters. The findings are tabulated below.

Type of net	Position of net	Total hauls	Successful hauls: Yellowtail		Successful hauls: Red sea bream		Catch: Yellowtail Total	Catch: Yellowtail Avg.	Catch: Red sea bream Total	Catch: Red sea bream Avg.
		No.	No.	%	No.	%	Kg.	Kg.	Kg.	Kg.
Ordinary trap	Inshore	51	30	59	23	45	146,942	4,898	2,211	96
	Offshore	51	28	55	4	8	157,893	5,639	16	4
	Offshore	58	30	52	11	19	93,393	3,113	171	16
Midwater trap	Inshore	58	41	71	39	67	53,334	1,301	2,341	60
	Inshore	72	59	82	40	56	53,990	915	4,118	103
	Offshore	72	60	83	37	51	99,934	1,666	3,088	84

[3 figures, 3 tables, 9 references]

[Abstracter: L. Baldwin

0.7 CAN ASIANS DIGEST LACTOSE?

Anonymous
Nature 221, No. 5184, 895 (March 8, 1969)

Findings by Davis and Bolin (1967) and by Flatz et al. (1969) have shown that Asian adults have a lactose intolerance traceable to a deficiency in intestinal lactase. Since this enzyme deficiency seems to be irreversible, the wisdom of stressing milk products in food aid programs for Asia is suspect. The editor of Process Biochemistry recently pointed out, however, that dairy products destined for food aid programs could be treated cheaply and wholesale with microbial preparations of lactase, thereby converting the lactose to a nutritional form acceptable to the Asian digestive system. [Abstracter: L. Baldwin]

0.8 INDUSTRY ATTACKS CHEMICAL DATA PROBLEM

Anonymous
Chemical and Engineering News 47, No. 16, 22-23 (April 14, 1969)

The various aids to information retrieval, particularly information in chemical and related fields, are mentioned, and the services provided by three of the systems are briefly described. The expanded services offered by the American Chemical Society's Chemical Abstracts Service, through its increasing conversion to a computer-based chemical registry system, are traced. The characteristics of the Mead Corporations' system--in which the full text of references can be scanned, inputs are in plain English without being specially programmed, and users can query the data bank by telephone--are covered. Also covered is the Institute for Scientific Information's system for assisting its subscribers keep up to date and make computer searches for chemical compounds; the Wiswesser line-notation form used for the structural and substructural description of each new compound is given special attention. [Abstracter: L. Baldwin]

0.4 BLOOD VOLUME REPLACEMENT MEDIUM

British Patent 1,126,628
Schlotan, Werner, Hans Kaller (Farbenfabriken Bayer A.-G., Germany)
Chemical Abstracts 70, No. 4, 14427b (January 27, 1969)

2.1128 (Cross Reference: 1.86)

TEST CRAB TRAPS FOR EFFICIENCY ON EAST COAST

Imbeault, Georges (Fishing Operations Branch, Industrial Development Service, Department of Fisheries, Ottawa, Canada)
Fisheries of Canada 21, No. 8, 3-6 (February 1969)

Crab traps of six different designs (bell, ink well, opposing wedge, lobster type, square, and rectangular) were tested for their suitability to the expanding Atlantic queen crab fishery. Low cost, ease of handling, minimum weight, maximum frame strength, and maximum efficiency were the goals. The square traps and the rectangular traps were the most efficient.

During the tests, a 60-inch-square, double-bottomed trap was developed. Its characteristics and the best method of hauling it are described. Seven line drawings showing construction details and method of setting are included in the article. [Abstracter: L. Baldwin]

1.0119 GREENLAND'S DEVELOPMENT POTENTIAL

Anonymous
World Fishing 18, No. 1, 29-31 (January 1969)

Because Greenland is somewhat isolated, the cost of producing fishery products is relatively high. This in turn puts a premium on the products. However, Greenlanders have adapted well to automated factory-line processing and aim at high-quality fishery products in order to compete in world markets. Additional commercial investment is needed to exploit the resources more fully. Brief descriptions of the developments in the cod and shrimp fisheries are given. [Abstracter: F. T. Piskur]

2.12 (Cross Reference: 1.53)

INFORME PRELIMINAR SOBRE EXPERIMENTOS DE MARCACION DE MERLUZA (MERLUCCIUS GAYI) EN CHILE [PRELIMINARY REPORT ON EXPERIMENTS IN TAGGING CHILEAN HAKE (MERLUCCIUS GAYI)]

Villegas, Luis, and Gunnar Saetersdal
Instituto de Fomento Pesquero Publicacion No. 37, 7+ pp. (1968) (In Spanish; English summary)

Chilean hake (Merluccius gayi) tagged during 1964-1966 with the Lowestoft yellow plastic flag-tag were returned by both handline and trawl fishermen. The experiments indicate that hake migrate extensively along the coast, moving northward in late winter or spring (during the main spawning period), and southward during the summer and the autumn. [6 figures, 9 tables]

[Abstracter: L. Baldwin]

7.595

RAPID METHOD FOR THE ESTIMATION OF EDTA IN FISH FLESH AND CRAB MEAT

Groninger, Herman S., and Kenneth R. Brandt (Technological Laboratory, Bureau of Commercial Fisheries, U.S. Fish and Wildlife Service, Seattle, Washington 98102)
Fishery Industrial Research 4, No. 6, 209-212 (February 1969)

EDTA (ethylenediaminetetraacetic acid) has been reported to be useful as an additive to seafoods to stabilize color, retard formation of struvite, inhibit enzyme-catalyzed changes in flavor, and inhibit growth of bacteria. It is usually applied to seafoods as a spray or a dip. All the analytical methods now used to determine EDTA in various materials are based on the chelating capacity of EDTA and, in general, apply only to specific types of products. This paper reports on the application of a method (modified from that of Pribil and Vesely [1967]) for the determination of EDTA in fish flesh and crab meat.

The fish flesh or crab meat is extracted with trichloroacetic acid. Phosphates in the extract are removed by precipitation as calcium phosphate. Citrates, if present, are removed by chromatography on cation resin. The EDTA in the extract is determined by titration with thorium nitrate solution.

The modified method gave about 90 percent recovery of added EDTA from samples of fish flesh and crab meat. [1 figure, 2 tables, 13 references]

[Abstracter: F. T. Piskur]

3.332 (Cross Reference: 7.87)

THE EFFECT OF STORAGE PRIOR TO PROCESSING ON THE QUALITY OF CANNED HERRING

McLay, R. (Ministry of Technology, Torry Research Station, Aberdeen, Scotland)
Journal of Food Technology 3, No. 4, 361-365 (December 1968)

The purpose of this study was to determine whether rancid fish lose their rancid flavor after canning.

Herring were held in ice for up to 10 days and then canned. The carbonyl content (a measure of rancidity) of the herring increased during storage of the fish in ice but remained constant in the canned fish irrespective of storage time prior to processing. A taste panel could not distinguish between samples of canned herring that were prepared from fish stored in ice for various times before being canned. [1 figure, 3 references] [Abstracter: F. T. Piskur]

9.125 (Cross Reference: 1.953)

"BLOW" OF THE PILOT WHALE

Olsen, C. Robert (Respiratory Research Laboratory, Veterans Administration Center, Los Angeles, California 90073), Robert Elsner (Physiological Research Laboratory, Scripps Institution of Oceanography, University of California, San Diego, La Jolla 92037), Frank C. Hale, and David W. Kenney
Science 163, No. 3870, 953-955 (February 28, 1969)

A young adult pilot whale (Globicephala scammoni) was held captive in seawater pools while her respiratory mechanism was studied. Her lungs emptied passively, without the aid of expiratory muscles, as much as 88 percent of their volume of gas within 0.5 sec. Measurements of pressures across the lungs and of volumes and flows of gas at the blowhole revealed that after expiration she inspired immediately by active muscular reexpansion of her lungs. She increased ventilation by inspiring more deeply, as does man; but she could hyperventilate to 30 times the resting levels simply by increasing her breathing frequency, an ability man does not have. [3 figures, 8 references]

[Abstracter: L. Baldwin]

3.337 (Cross Reference: 0.6)

SIMPLIFIED EQUATIONS FOR CALCULATING LETHALITY OF THE HEATING AND COOLING PHASES OF THERMAL INACTIVATION DETERMINATIONS

Dickerson, R. W., Jr. (Food Protection Research, Environmental Sanitation Program, National Center for Urban and Industrial Health, Cincinnati, Ohio)
Food Technology 23, No. 3, 108-111 (March 1969)

The authors developed a simplified procedure for calculating the lethality of the heating and cooling phases of thermal inactivation processes; the normal restrictions existing in thermal inactivation experiments were applied. Ball et al. (1957) developed equations for calculating lethality for both the heating and cooling processes. The present author reduced Ball's equations to simplified forms, eliminating the antilogarithms and exponential integrals. Using these simplified equations, the lethality of the heating and cooling phases can be calculated in less than 1 minute with an accuracy better than [within] 1 percent. [1 figure, 6 references] [Abstracter: F. T. Piskur]

9.15 PESTICIDES: PRESENT AND FUTURE

Anonymous
Chemical Engineering 76, No. 7, 133-140 (April 7, 1969)

Pesticides are a blessing when they put an end to the plaguelike attacks of insects and of diseases in crops and livestock, when they prevent typhoid epidemics, or when they drastically reduce malaria. They are a bane when they destroy animal species they are not aimed at or when they pollute the environment. The ideal pesticide, then, is specific to the pest but harmless to plants, animals, and humans. The report discusses new products being developed and new approaches being taken to attain the ideal by overcoming the disadvantages of existing pesticides--for example, their erratic selectivity or their toxicity to warm-blooded animals through residue buildup or through food contamination. One such approach is the biological control of pests. The manufacture of some of the more commercially important pesticides are described. [4 figures, 3 tables]
[Abstracter: L. Baldwin]

Beckmans, I. (Belgium)
Chemical Abstracts 70, No. 4, 14248u (January 27, 1969)

9.19 TOXICITY OF SUBSTANCES PRESENT IN LIQUID WASTES FROM PICKLING PLANTS AND FROM THE TREATMENT OF METALS

6.37 (Cross Reference: 2.9)

THE ALLEGED TOXICITY OF SOME MARINE ALGAE

Larson, Edward (The Miami Seaquarium, Miami, Florida), and John Humphries (Department of Biology, University of Miami, Coral Gables, Florida)
Federation Proceedings 28, No. 2, 610, Item 1959 (March-April 1969)

To examine a statement (Halstead, 1959) that algae are a source of toxicity, the authors tested the effects of Bryopsis hypnoides, Gracillaria compressa, and Ulva lactuca on hamsters, mice, and chicks. The algae were gathered in an area where most of the authors' specimens of toxic fish (Spheroides [Sphaeroides] maculatus) are caught. Suspensions of the algae were repeatedly administered orally to the hamsters; no effects were noticed. Aqueous extracts were injected intraperitoneally into the mice; some of the extracts caused a few delayed deaths, but bacteria-free extracts caused none. Mixtures of equal portions of each of the algae and Purina Startena were fed to the chicks (in amounts equal to 10 percent of the chicks' body weight) for 10 consecutive days; the chicks gained weight, developed normally, and evidenced no changes in body temperature. The controls were fed lettuce (Lactuca sativa) and Purina Startena.
[Abstracter: L. Baldwin]

7.85 DIRECT BACTERIAL COUNT AS A RAPID FRESHNESS TEST FOR FISH FILLETS

Lerke, Peter, and Lionel Farber (Seafood Research Laboratory, The George Williams Hooper Foundation, University of California Medical Center, San Francisco 94122)
Applied Microbiology 17, No. 2, 197-201 (February 1969)

The ability to assess the state of freshness of any given lot of fish fillets would be of economic value to the fishery industry. A practical test for freshness must be simple, rapid, and accurate. The present paper reports the use of the direct bacterial count to measure the freshness of rockfish (Sebastodes spp.) and English and petrale sole (Parophrys vetulus and Eopsetta jordani).

The fillets were stored at either 5° or 10° C. To obtain direct bacterial counts, a thin film made from surface material of the fillet was spread on a microscope slide, stained, and read under the microscope. Additional tests included: viable bacterial count and estimation of hypoxanthine, volatile reducing substances, and trimethylamine nitrogen.

Initial direct bacterial counts were found to correlate well with keeping quality of the fillets. A period of freshness of 24 or 48 hr. at 5° C. could be predicted reliably. Preliminary data indicated that hypoxanthine content might be used for predicting the shelf life of fish fillets but that the test procedure is too complex for practical application.
[3 figures, 2 tables, 10 references] [Abstracter: F. T. Piskur]

9.13 MARINE MICROORGANISMS ASSOCIATED WITH THE FOOD OF YOUNG SALMON

Seki, Humitake (Fisheries Research Board of Canada, Pacific Oceanographic Group, Biological Station, Nanaimo, British Columbia, Canada)
Applied Microbiology 17, No. 2, 252-255 (February 1969)

Marine microorganisms, by collecting abiotic organic matter, are important in the food chain of the sea. They may be utilized indirectly through the chain of zooplankton and micronekton. The question arises whether the microorganisms may also be digested directly by the fish. Since bacterial aggregates may at times be numerous in the pelagic zone, their utilization by fish may be a pathway in the pelagic food chain. The purpose of this study was to measure the mass of microorganisms in the digestive tracts of salmon.

The mass of microorganisms in the digestive tracts was measured by (1) direct microscopic count, (2) bacterial plate count, and (3) the physiological method (based on the amount of carbon dioxide released by a mass of bacteria).

The microbial mass in foods decreased during its stay in the digestive organ. The microbial mass in the digestive tract of the salmon was dependent upon the type of food ingested. [3 figures, 2 tables, 18 references]
[Abstracter: F. T. Piskur]

9.6 MOLLUSCAN STUDIES

Fretter, V. (Editor)
Studies in the Structure, Physiology and Ecology of Molluscs (Proceedings of a Symposium held at the Zoological Society of London, March 8 and 9, 1967. Symposia of the Zoological Society of London, No. 22), xvii + 377 pp. (Academic Press: London and New York [October 1968]) Price $15.
Reviewed by C. M. Yonge
Nature 221, No. 5182, 782 (February 22, 1969)

The 29 papers constituting this symposium cover subjects ranging from electron-microscopic, cytochemical, and pharmacological studies of the brain and neurones of the common garden snail to a presentation of evidence on changes in the population of land Mollusca in England since the last Glacial Period. It includes such other subjects as the present distribution of mollusks in relation to available habitats in the Solomon Islands, the dynamics of burrowing, the effects of transport of empty bivalve shells, and gametogenesis and oviposition in the fresh-water snail. It is well illustrated. [Abstracter: L. Baldwin]

9.16 POWER STATIONS AS SEA FARMS

Nash, C. E. (Experimental Fish-Rearing Plant, Nuclear Power Station, Hunterston, Ayrshire, Scotland)
New Scientist 40, No. 623, 367-369 (November 14, 1968)

Hatchery-bred plaice and sole reared in tanks fed by the discharge from both nuclear and coal-fired electric power plants grew to marketable size in half the time they would have required under natural conditions. These site trials pointed up the need for additional knowledge about fish health (involving disease, parasites, nutrition, and predators) and selective breeding; the effects of stock density and tank dimensions; production of cheap, easily stored, easily fed foods; improvements in flesh taste and texture; and control of environmental conditions in the tanks. However, they also pointed to the possibility of growing, in one area, stratified or mixed populations of fish and shellfish that are indigenous to other parts of the world. [Abstracter: L. Baldwin]

9.7 (Cross Reference: 0.7)

CLASSIFICATION AND RETRIEVAL OF NUTRITION INFORMATION

Wallin, Beth D. (1319 Pomona, Ann Arbor, Michigan), and Frances Mather (School of Public Health, The University of Michigan, Ann Arbor)
Journal of the American Dietetic Association 54, No. 3, 194-197 (March 1969)

Classification is the key to information retrieval. The classification system described here is adaptable to either machine or manual retrieval of reference material. It allows for extensive cross referencing, periodic revision, and ready physical location of material, and for easy conversion of the system from manual to machine operation. The information to be retrieved may be stored on either punch cards or magnetic tape. [2 figures, 4 references]
[Abstracter: L. Baldwin]

9.16 THE ABSORPTION AND DISTRIBUTION OF A CHEMOTHERAPEUTIC AGENT, P-7138 IN FISHES

Takase, Yoshiyuki, and Masanao Shimizu (Dainippon Pharmaceutical Co., Research Laboratory, Ebie-kami, Fukushima-ku, Osaka, Japan), and Saburoh S. Kubota (Prefectural University of Mie, Faculty of Fisheries, Tsu, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 34, No. 12, 1118-1123 (December 1968) (In English)

To find a prophylactic and therapeutic agent that might be effective against bacterial infections in fish, the authors administered P-7138 (6-hydroxymethyl-2-[2-(5-nitro-2-furyl) vinyl] pyridine) orally and externally to eels (Anguilla japonica), goldfish (Carassius auratus), yellowtail (Seriola quinqueradiata), and abalone (Haliotis gigantea). All absorbed the compound rapidly and eliminated it quickly; little was accumulated in the fishes' bodies.
[5 figures, 5 tables, 4 references] [Abstracter: L. Baldwin]

9.19 OIL-SPILL CLEANUP: A MATTER OF $'S AND METHODS

Pattison, D. A.
Chemical Engineering 76, No. 3, 50-52, 54 (February 10, 1969)

The report describes efforts on the part of industry and government to cope with major oil spills. Of particular interest is a table summarizing some leading oil-spill treatments. The table lists the company developing the treatment; the product name(s), composition, action, and treatment level; the unit cost and estimated cost per gallon of oil treated; where used; advantages; and disadvantages. [5 photographs, 1 table] [Abstracter: F. T. Piskur]

9.13 FREEZING RESISTANCE IN SOME ANTARCTIC FISHES

DeVries, Arthur L. (Department of Food Science and Technology, University of California, Davis 95616), and Donald E. Wohlschlag (University of Texas, Marine Science Institute, Port Aransas 78373)
Science 163, No. 3871, 1073-1075 (March 7, 1969)

Water temperatures in McMurdo Sound, Antarctica, average -1.87° C. throughout the year. The adaptational mechanisms that enable fish to survive under these freezing conditions are of ecological and physiological importance. Therefore the authors studied the freezing resistance of three marine fishes living in the Sound: Trematomus borchgrevinki, a semipelagic fish, and Trematomus bernacchii and Trematomus hansoni, both benthic fishes.

Measurements of serum freezing points indicated that the three fishes do not freeze because their blood and the sea water are isosmotic. Concentrations of sodium chloride, urea, and free amino acids accounted for only half the freezing-point depression of the serum; a glycoprotein accounted for 30 percent.
[1 table, 2 figures, 14 references] [Abstracter: L. Baldwin]

9.7 (Cross Reference: 0.6)

RECOMMENDATIONS ON SUBJECT MATTER OUTLINES FOR FOOD ORIENTED COURSES

Roberts, William M., G. E. Livingston, Charles J. Duffy, Charles N. Frey, R. C. Pearl, E. L. Wick, and P. A. Wolf (Committee on Education, Council of the Institute of Food Technologists, Suite 2120, 221 North La Salle Street, Chicago, Illinois 60601)
Food Technology 23, No. 3, 33-37 (March 1969)

The Council of the Institute of Food Technologists in 1966 adopted minimum standards for undergraduate education in food science and technology. The standards were published in Food Technology 20, No. 12, 61 (December 1966). Suitable text books for the courses were not available. Task force groups of recognized authorities developed guidelines for course contents in the various subject matter areas. Outlines are presented for courses in: Introductory Food Science, Food Engineering, Food Chemistry, Food Analysis, Food Microbiology, and Food Processing. These guidelines should be of considerable value to instructors teaching the courses and to authors interested in writing textbooks in this field.
[Abstracter: F. T. Piskur]

9.6 BOOKS AND ARTICLES ON MARINE MAMMALS

Todd, Ethel I. (compiler) (Bureau of Commercial Fisheries Marine Mammal Biological Laboratory, Seattle, Washington 98115)
Circular 299, 14 pp. (December 1968) (Bureau of Commercial Fisheries, U.S. Fish and Wildlife Service, Washington, D.C. 20240)

This compilation of books and articles written in English (or available in English translation) contains 10 citations for marine mammals, 190 for pinnipeds (sea lions; walruses; and fur, phocid, hooded, elephant, and monk seals), and 124 for cetaceans (baleen and toothed whales). With 13 exceptions, all the literature cited was published within the past 25 years. [Abstracter: L. Baldwin]

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Hashimoto, Yoshiro	11	4.92
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